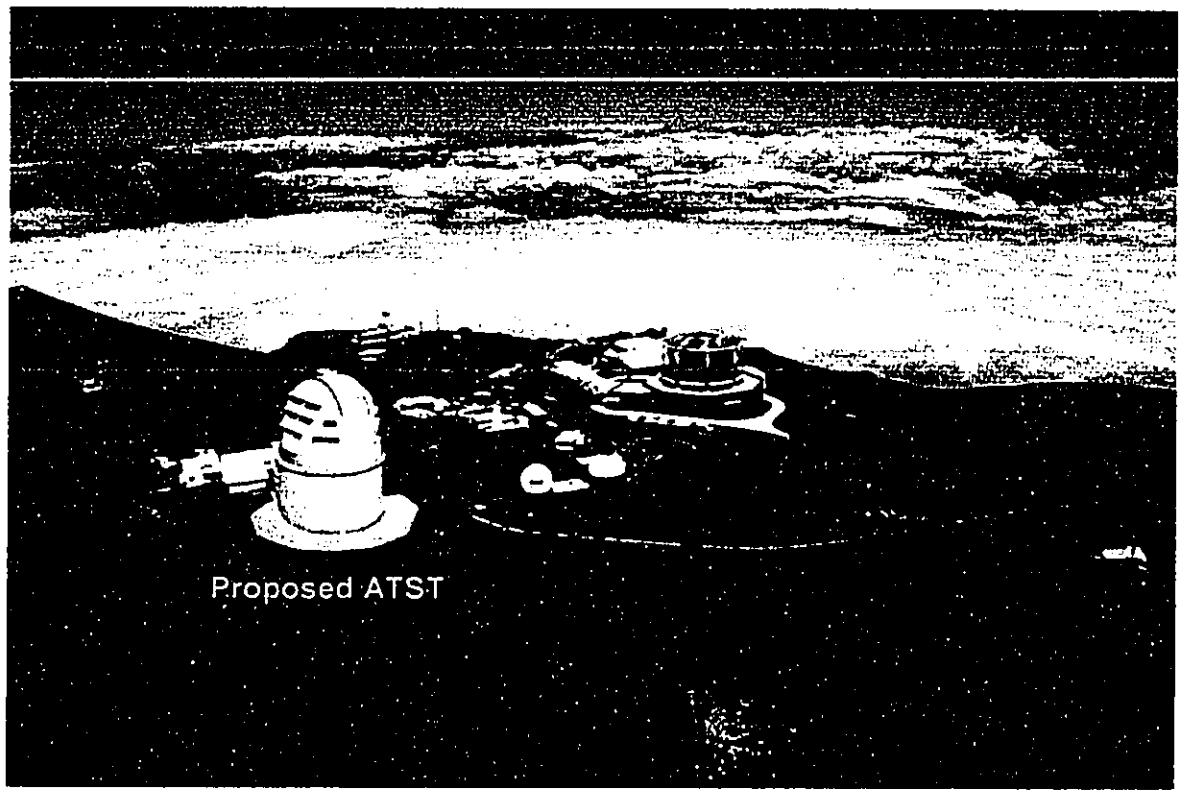

The Advanced Technology Solar Telescope (ATST)
Environmental Impact Statement Preparation Notice (EISPN)

August 2005

Prepared for

Accepting Authority
Office of the Governor, State of Hawai`i

Prepared by

KC Environmental, Inc.

P.O. Box 1208
Makawao HI 96768

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1.0 INTRODUCTION

This Environmental Impact Statement Preparation Notice (EISPN) is prepared pursuant to the State of Hawai`i, Department of Health, Chapter 343, Hawai`i Revised Statutes (HRS), and Title 11, Chapter 200 Hawai`i Administrative Rules (HAR) (Environmental Impact Statement Rules). The proposed project is an applicant action by the National Science Foundation for the development of the Advanced Technology Solar Telescope (ATST) within the 18.166-acre University of Hawai`i Institute for Astronomy (IfA) Haleakalā High Altitude Observatories (HO) site at the summit of Haleakalā, County of Maui, Hawai`i. Figure 1 shows the tax key map and general location of the proposed project. Figure 2 shows the HO site tax map key and adjacent properties. Figure 3 is an aerial photograph showing existing structures within the HO complex. Figure 4 is a graphic layout of the Haleakalā Observatories.

The preparation of the EISPN is being undertaken to address requirements under HRS Chapter 200, Title 11, in that the proposed ATST may potentially meet one or more of the significance criteria for impact on Conservation District Land. The EISPN is also being prepared in accordance with HAR 13-5-31, which requires an Environmental Impact Statement to accompany the required Conservation District Use Application (CDUA), where significant impacts may be anticipated.

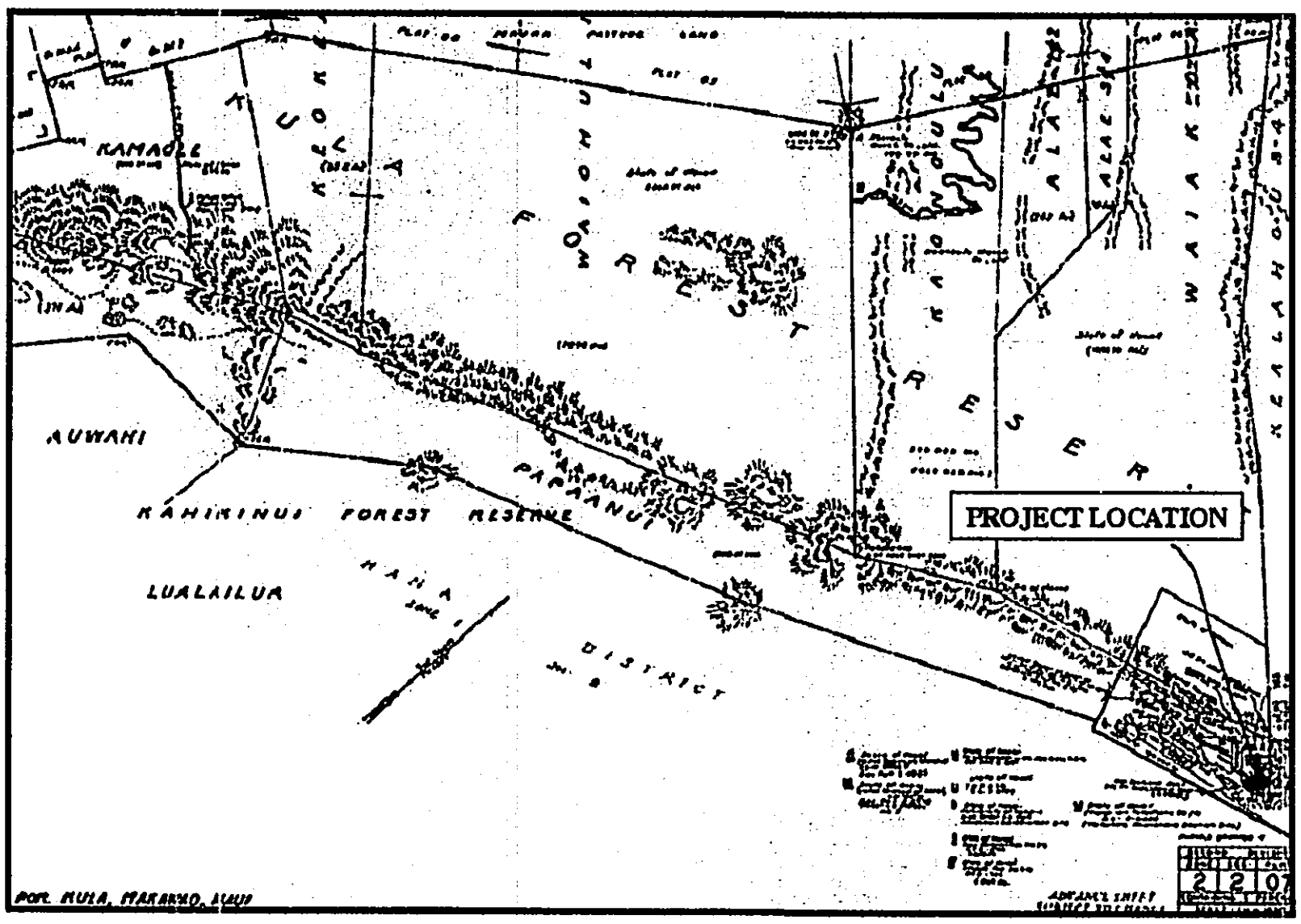

Figure 1. State of Hawai`i Tax Map, Zone 2, Section 2, Plat 07 and General Location of the Proposed ATST Project

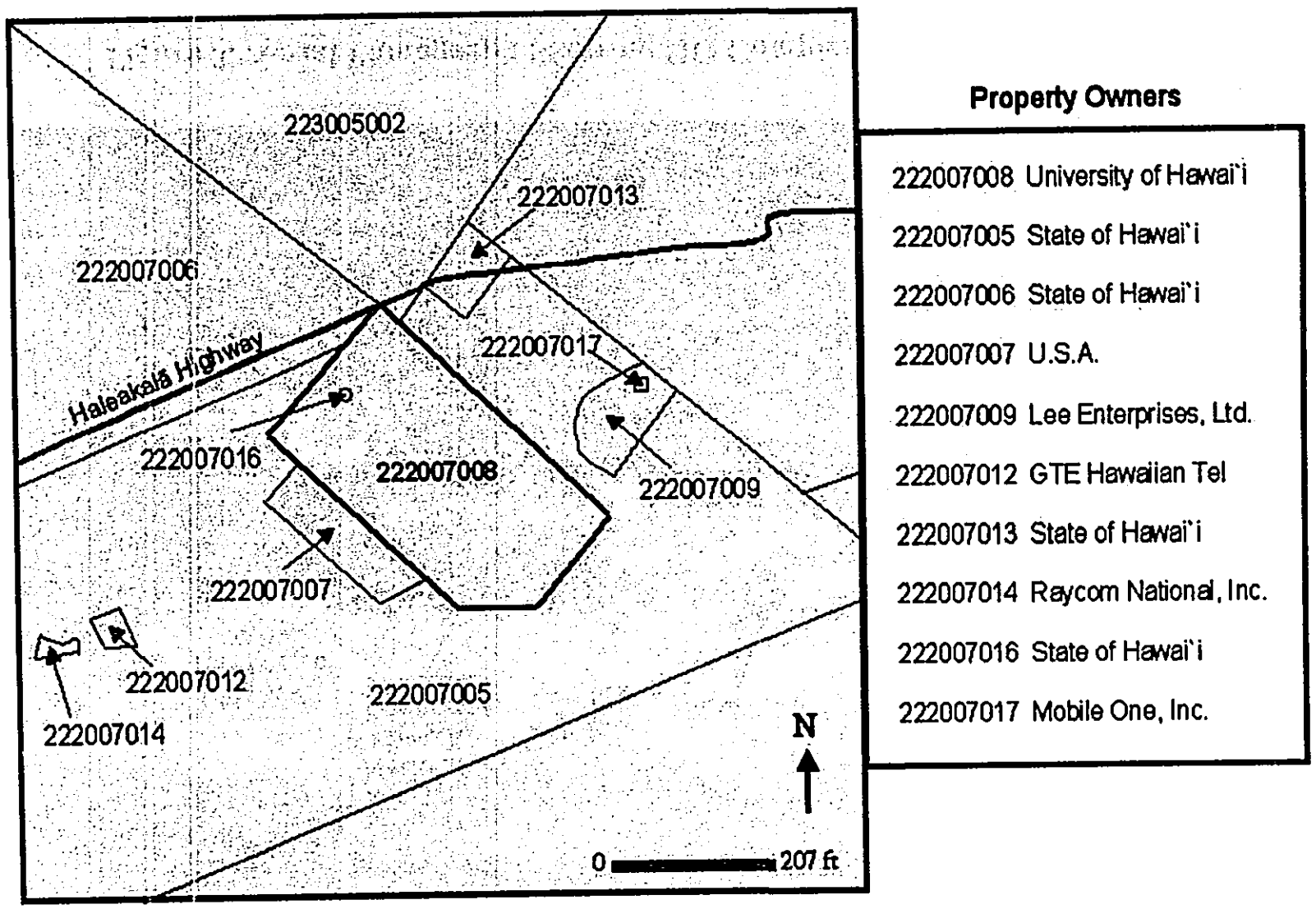

Figure 2. Haleakalā Observatories (HO) Site Tax Map Key and Adjacent Properties

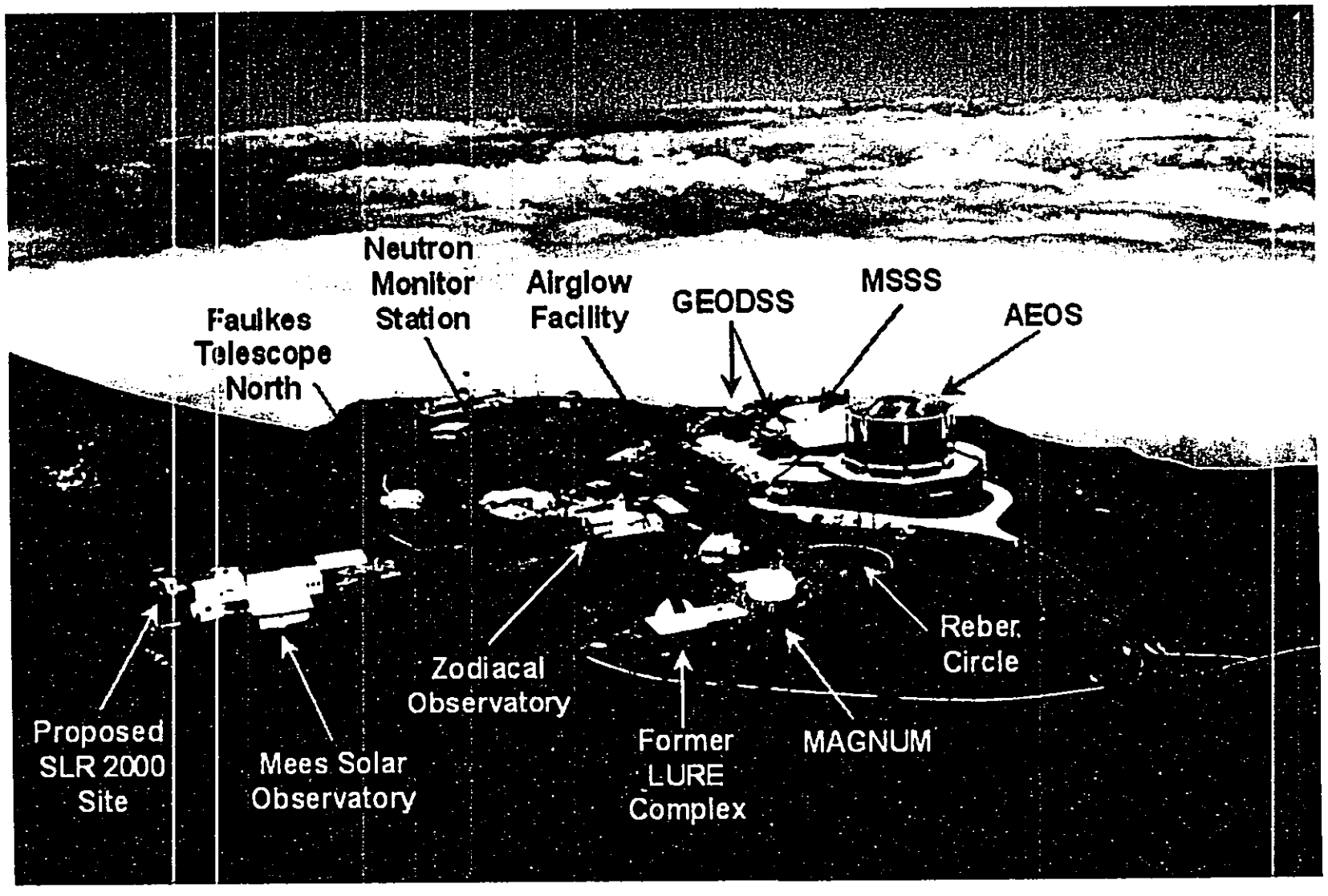

Figure 3. Aerial Photograph Showing HO Complex and Existing Structures

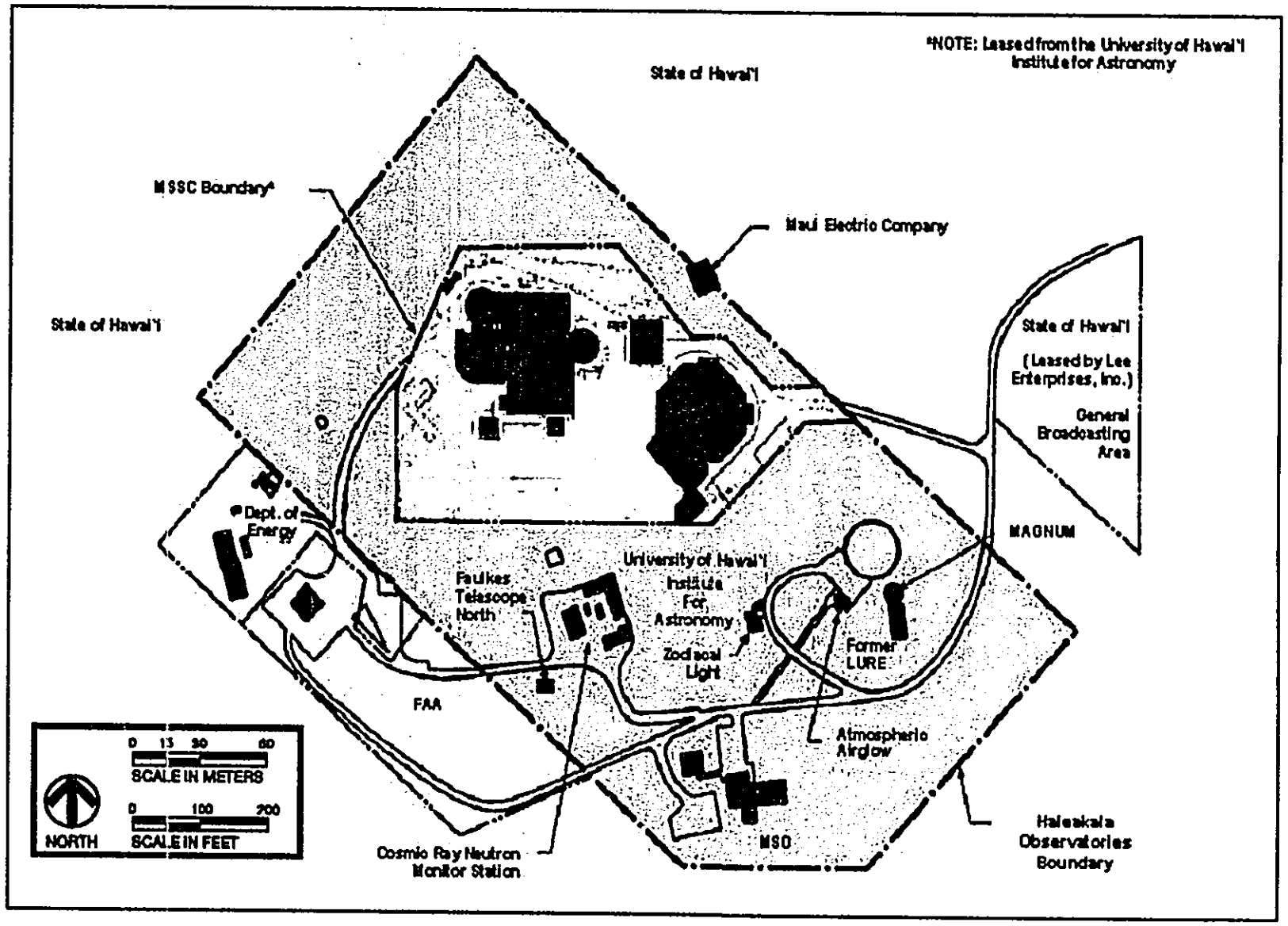

Figure 4. Graphic Layout of Haleakalā Observatories

1.1 PROJECT SUMMARY

Project Name:	Advanced Technology Solar Telescope (ATST)
Location:	Haleakalā High Altitude Observatories (HO), Maui, Hawai`i
Judicial District:	Waiakoa, Papaanui, Makawao
Applicant:	National Science Foundation
Recorded Fee Owner:	University of Hawai`i
Tax Map Key(s):	(2) 2-2-07:008
Land Area:	18.166 acres (entire HO site), 0.60 acres (25,800 sq ft, proposed project area)
Existing Use:	Observatories
State Land Use:	Conservation, General Subzone
County General Plan:	Conservation
County Zoning:	None
Special Management Area:	Not within SMA
Accepting Authority:	Office of the Governor, State of Hawai`i
Anticipated Determination:	The anticipated determination is that the proposed action requires the preparation of an Environmental Impact Statement based on the significance criteria set forth in Chapter 200, Title 11, State of Hawai`i, Department of Health.

1.2 LOCATION

The proposed ATST project would be located within the 18.166-acre Haleakalā High Altitude Observatories (HO) site at the summit of Haleakalā, County of Maui, Hawai`i. It is proposed to be constructed on approximately 0.60 acres (25,800 sq ft) of undeveloped land east of the existing Mees Solar Observatory facility, or at the alternative site within HO at Reber Circle shown in Figure 5.

1.3 LAND OWNERSHIP

The University of Hawai`i is the recorded fee owner of the parcel identified as TMK (2) 2-2-07-008. Figure 1 shows the tax key map and general location of the proposed project. Figure 2 shows the HO site tax map key and adjacent properties.

1.4 IDENTIFICATION OF APPLICANT

The applicant is the National Science Foundation (NSF), Division of Astronomical Sciences.

Contact: NSF c/o Mr. Jeremy Wagner, ATST Project Manager
National Solar Observatory
P. O. Box 26732
Tucson, AZ 85726-6732
Telephone: 520-318-8249 Fax: 520-318-8581

1.5 IDENTIFICATION OF ENVIRONMENTAL CONSULTANT

The National Science Foundation's environmental and entitlement-planning consultant for the ATST is KC Environmental, Inc.

Contact: Dr. Charlie Fein, Vice-President
KC Environmental, Inc.
P. O. Box 1208
Makawao, HI 96768
Telephone: 808-573-1903 Fax: 808-573-7837 Direct: 808-281-7094

1.6 IDENTIFICATION OF ACCEPTING AUTHORITY

The accepting authority for this project will be the Office of the Governor, State of Hawai`i, which is also the agency primarily responsible for the action. The Office of the Governor assumes responsibility for accepting the EIS in accordance with HAR Title 11 Chapter 200-4(a).

Contact: Honorable Governor Linda Lingle
Office of the Governor, State of Hawai`i
Executive Chambers, State Capitol Building
Honolulu, HI 96813
Telephone: 808-586-0034

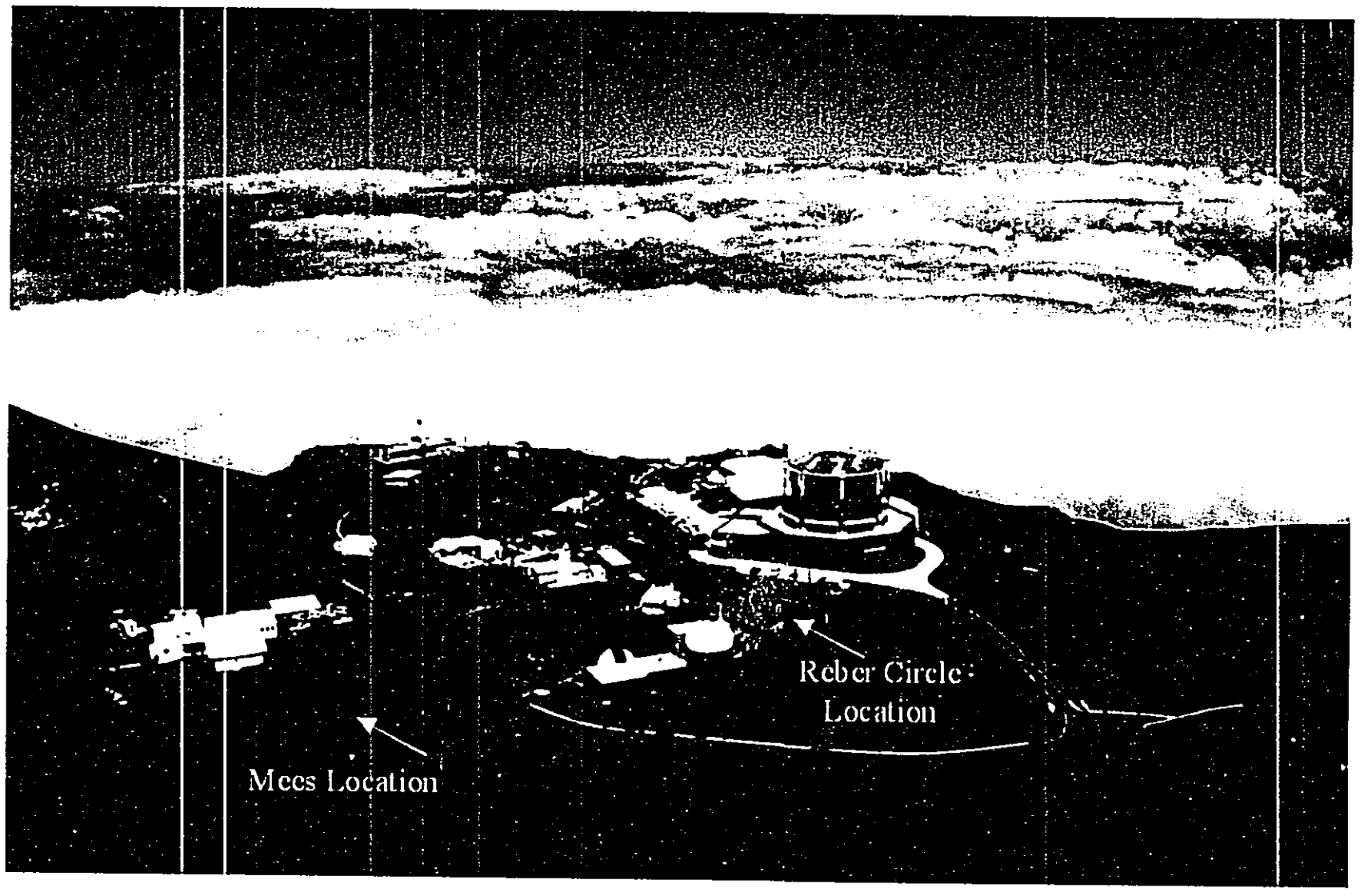

Figure 5. Mees and Reber Circle Site Locations

1.7 COMPLIANCE WITH STATE OF HAWAI'I ENVIRONMENTAL LAWS

This EISPN is prepared pursuant to State of Hawai'i Department of Health, Chapter 343, HRS, and Title 11, Chapter 22, HAR. The proposed project is an applicant action by the National Science Foundation for the development of the Advanced Technology Solar Telescope (ATST) comprising approximately 0.60 acres (25,800 sq ft) located within the 18.166-acre Haleakalā High Altitude Observatories (HO) site at the summit of Haleakalā, County of Maui, Hawai'i. As the proposed project involves the use of State Conservation lands, the preparation of this EIS is undertaken to address potential requirements under Chapter 343, HRS.

1.8 STUDIES TO BE CONDUCTED AND INCLUDED IN THE ENVIRONMENTAL IMPACT STATEMENT (EIS)

A preliminary description of the environment, alternatives considered, preliminary impact determination, and proposed mitigation measures are provided in this EISPN. The information contained in this report has been developed from site visits, technical consultant reports, public agencies, public comments, and generally available information regarding the characteristics of the site and surrounding area. Consultant reports referenced in this document will be appended to the Draft EIS (DEIS).

Technical surveys and studies (Table 1) to assess the existing natural and physical conditions of the proposed ATST primary and alternative site locations and the potential impacts of development of the property have been prepared or are being prepared. As noted, these studies will be appended to the Draft EIS.

Table 1. Technical Surveys and Studies for Proposed ATST Project

1	Archaeological Resources
2	Air Quality
3	Arthropod Inventory
4	Biological Resources and Threatened/Endangered Species
5	Cultural Resources
6	Cultural Traditional Uses
7	Cumulative Impacts
8	Geological Survey
9	Hydrology, Water Quality, and Wastewater
10	Land Use, Existing Activities
11	Noise
12	Socioeconomic Impacts
13	Solid Waste
14	Traffic and Safety Impacts
15	Utilities and Services
16	View Plane Assessment

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2.0 PROJECT DESCRIPTION

This section provides background information and a general description of the proposed ATST project and discusses the development timetable and preliminary estimated costs.

2.1 PROJECT LOCATION

In 1961, Executive Order 1987 from Hawai`i's Governor Quinn to the University of Hawai`i (UH), set aside 18.166 acres of land on the summit of Haleakalā to establish the Haleakalā High Altitude Observatories (HO) site. The proposed ATST project would be located within HO at either the Mees or the Reber Circle site locations, as shown in Figure 5.

The proposed ATST project would be located on State of Hawai`i land within the Conservation District on Pu`u Kolekole, near the summit of Haleakalā. It is about 0.3 miles from the highest point, Pu`u Ula`ula, or Red Hill Overlook, which is in Haleakalā National Park. At an elevation of 10,023 feet, Haleakalā is one of the prime sites in the world for astronomical and space surveillance activities. The Kolekole cinder cone lies near the apex of the Southwest rift zone of the mountain. The rift zone forms a spine separating the Kula Forest Reserve from the Kahikinui Forest Reserve, both of which are pristine lands along the rift zone.

Immediately east of Haleakalā Observatories is the General Broadcasting Area, with television transmitting and receiving stations on State-owned land. A Federal Aviation Administration (FAA) air traffic control repeater station and a U.S. Department of Energy (DOE) research facility are situated immediately to the west of Haleakalā Observatories. Other land bordering Haleakalā Observatories is owned by the State of Hawai`i and controlled by the Department of Land and Natural Resources (DLNR). The road leading up to Haleakalā Observatories crosses through Haleakalā National Park.

2.2 EXISTING USES

In 1961, the 18.166 acres of land were designated and assigned to the University of Hawai`i Institute for Astronomy (IfA) for scientific purposes. UH IfA is responsible for managing and developing the land. Other agencies established adjacent facilities through Executive Order during the same period.

Presently, facilities located within HO (Figure 3) observe the Sun, monitor active galactic nuclei and quasars, use lasers to measure the distance to satellites, track and catalogue man-made objects, track asteroids and other natural potential space threats to life on Earth, obtain detailed images of spacecraft and provide a telescope observations for education and outreach to students K-12 in Hawai`i and the United Kingdom. It is a principal site for optical and infrared surveillance, inventory and tracking of space debris, and active laser illumination of objects launched into earth orbit.

Of the 18.166 acres, 4.5 acres are leased to the United States Army Corps of Engineers for the United States Air Force Maui Space Surveillance Complex (MSSC), whose primary mission is to conduct space surveillance and research activities for the Department of Defense (DoD). Another

major part of the MSSC is the Ground-Based Electro-Optical Deep Space Surveillance System (GEODSS), which is one of three operational sites in the world performing ground-based optical tracking of space objects.

Astronomical research facilities for advanced studies of astronomy and atmospheric sciences are also located at HO, as follows:

1. The C. E. Kenneth Mees Solar Observatory (MSO), which emphasize studies of the solar corona and chromosphere.

2. The Zodiacal Observatory facility, which houses the test-bed SOLAR-C Telescope Facility, both supported by UH IfA.

3. The former Lunar Laser Ranging Experiment (LURE) Observatory, which is currently being renovated for the Panoramic-Survey Telescope and Rapid Response System (Pan-STARRS) Test-Bed.

4. The University of Tokyo, the National Observatory of Japan, and the Australian National University supports the Multi-color Active Galactic Nuclei Monitor (MAGNUM) telescope, which is used for long-term monitoring of many active galactic nuclei (AGNs) and quasars.

5. The Faulkes Telescope Facility, which houses the largest educational outreach optical telescope in the world in support of astronomy research and education for grades Kindergarten through college in Hawai`i and the United Kingdom.

6. The Cosmic Ray Neutron Monitor Station operated in association with the University of Chicago Enrico Fermi Institute.

2.3 PROPOSED USE

The proposed ATST project would be the largest and most capable solar telescope in the world with its unprecedented 4-meter aperture, integrated adaptive optics, low scattered light, infrared coverage, and state-of-the-art post-focus instrumentation. It would be an indispensable tool for exploring and understanding physical processes on the Sun that ultimately affect Earth.

The ATST represents a collaboration of 22 institutions, reflecting a broad segment of the solar physics community. The design phase of the project to build the next generation ground-based solar telescope is underway and the two-year site selection process was concluded near the end of 2004. Haleakalā Observatories was the candidate site selected out of the original 72 considered.

2.4 SURROUNDING USES

Surrounding land uses include Haleakalā National Park, State of Hawai'i Conservation Land, and private land ownership.

2.5 PROJECT NEED

As the largest and most capable national solar telescope, ATST would allow scientific studies that are currently impossible to perform and would have broad impacts on astronomy, plasma physics, and solar-terrestrial relations by resolving fundamental astrophysical processes in space and time on the Sun. The ATST will attack critical details of the non-linear dynamical processes that govern the highly conducting, turbulent solar plasma. The large aperture, wide field-of-view, broad wavelength range, high spatial resolution and other recent technological developments that ATST will employ are an absolute necessity because the field of solar physics has developed rapidly over the last decade to a point where sophisticated theories and models await critical observational tests. However, existing instrumental capabilities at facilities such as the Mees Solar Observatory no longer are sufficient to meet this challenge. The recent demonstration of a practical solar adaptive optics system, coupled with other advances in innovative and powerful instrumental techniques, now promises a major advance in solar observing capabilities.

2.6 DEVELOPMENT TIMETABLE AND PRELIMINARY ESTIMATED COSTS

The proposed development timetable for ATST is shown in Figure 6. Table 2 shows the preliminary estimated costs associated with ATST.

Table 2. Preliminary Estimated Cost Breakdown for Proposed ATST Project

Description		Preliminary Cost
Project Management		$19,790,883
Fabrication		
	Telescope Assembly	$45,590,527
	Wavefront Correction	$7,567,850
	Instrumentation	$23,566,621
	High-Level Controls	$5,130,625
	Enclosure	$20,292,965
	Support Facilities	$14,874,250
	Off-Site Remote Operations Building	$4,494,500
Integration, Test and Commissioning		$8,126,719
Education and Public Outreach		Education and Public Outreach is currently set at $0 because the NSF requires it to be a separate proposal outside of construction.
TOTAL IN YEAR 2004 US DOLLARS		**$149,434,940**
TOTAL INCLUDING INFLATION		**$175,024,956**

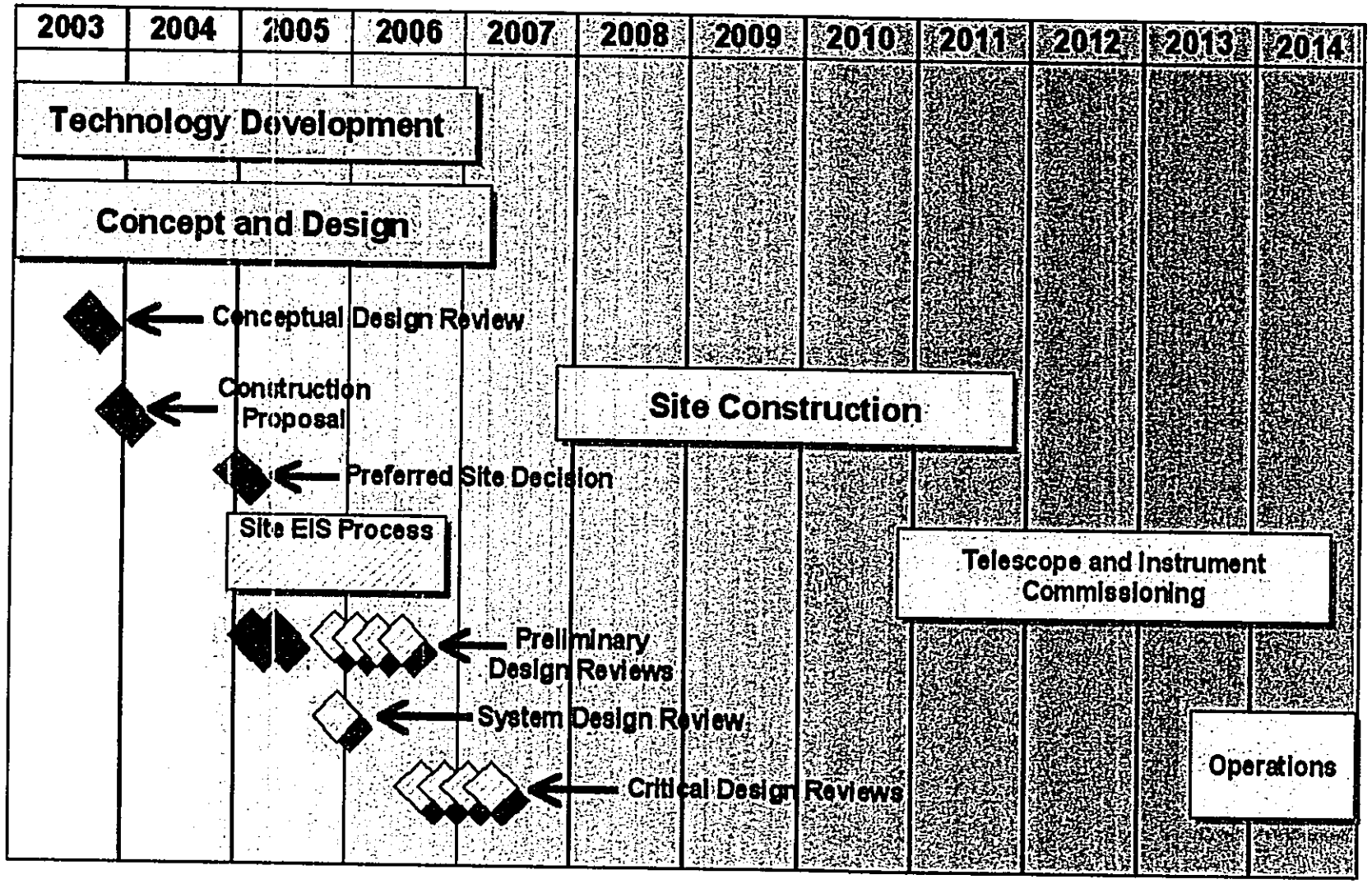


Figure 6. Proposed Development Timetable

3.0 LAND USE CONFORMANCE

The processing of various permits and approvals are prerequisites for the construction of the ATST. Relevant State of Hawai`i land use plans, policies, and ordinances are described below.

3.1 STATE OF HAWAI`I

3.1.1 Chapter 343, Hawai`i Revised Statutes (HRS)

Compliance with Chapter 343, HRS, is required as described earlier in Section 1.7.

3.1.2 State Land Use Law, Chapter 205, Hawai`i Revised Statutes (HRS)

In 1961 the State Land Use Law (Act 187), codified as HRS, Chapter 205, established the State Land Use Commission (LUC), and granted the LUC the power to zone all lands in the State into one of four districts: Agriculture, Conservation, Urban and Rural. Act 187 vested the Department of Land and Natural Resources (DLNR) with jurisdiction over the Conservation District. The DLNR formulated subzones within the Conservation District (Figure 7) and regulates land uses and activities therein. Conservation District Subzone designations, regulated by the State DLNR, are Protective, Limited, Resource, General, and Special. Since 1964, the Board of Land and Natural Resources (BLNR) has adopted and administered land use regulations for the Conservation District.

The existing State Land Use District for this proposed project is designated as Conservation District, General Subzone. The objective of the General Subzone is to designate open space where specific conservation uses may not be defined, but where urban use would be premature.

During the past few years, the Office of Coastal and Conservation Lands (OCCL) within the DLNR has administered Conservation District Use Applications (CDUAs) for numerous potential uses, among them telescopes on top of Haleakalā and Mauna Kea.

The proposed ATST project would be located in the area of the Conservation District that has been set aside for astronomical research, and many facilities conducting astronomy and advanced space surveillance already exist within the HO area.

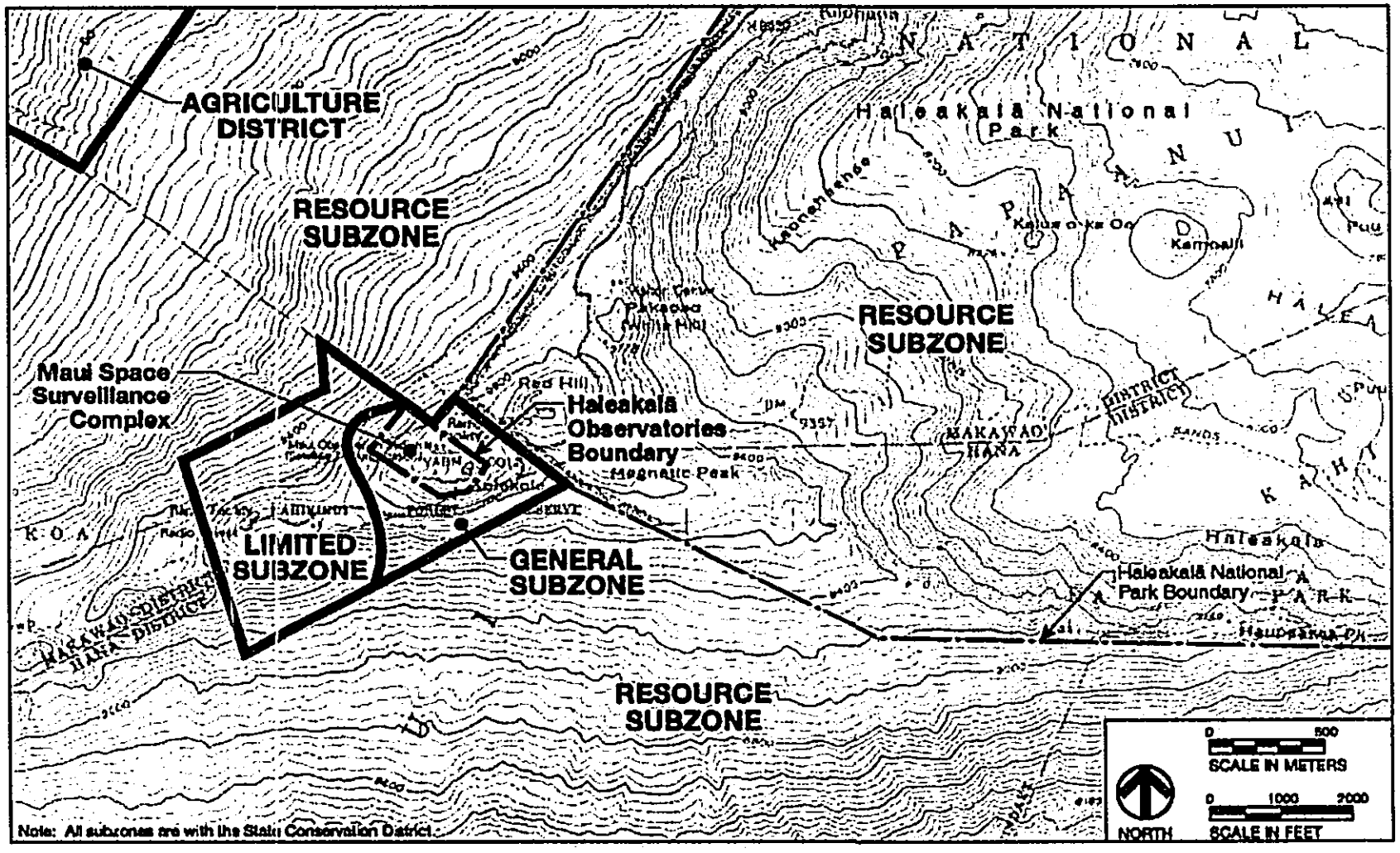


Figure 7. Haleakalā Land Use Districts

3.1.3 Coastal Zone Management Act, Chapter 205A, Hawai`i Revised Statutes (HRS)

The Coastal Zone Management Area (CZMA) as defined in Chapter 205A, HRS, includes all the lands of the State. The subject parcel is not within the Special Management Area, pursuant to the County of Maui Planning Department map entitled *Island of Maui Showing Special Management Area.* This map is provided by the County of Maui GIS Program Office of the Managing Director, dated July 2002, and is located in the Zoning and Administration Enforcement Division of the Planning Department, Wailuku, Maui. The map clearly indicates that the proposed ATST that would be located in the HO complex would not be in the Coastal Zone Management area.

3.1.4 Hawai`i State Plan, Chapter 226, Hawai`i Revised Statutes (HRS)

The Hawai`i State Plan, Chapter 226, HRS establishes a set of goals, objectives and policies that serve as long-range guidelines for the growth and development of the State. The Plan is divided into three parts: Part I-Overall Theme, Goals, Objectives and Policies, Part II-Planning, Coordination, and Implementation; and, Part III-Priority Guidelines.

The elements of Part II of the State Plan pertain primarily to the administrative structure and implementation process of the Plan. As such, comments regarding the applicability of Part II to the proposed ATST project are not appropriate. The sections of the Hawai`i State Plan directly applicable to the proposed ATST project, along with a discussion of how the proposed project conforms to the State Plan, will be included in the Draft EIS.

3.1.5 State Functional Plans

The Hawai`i State Plan directs State agencies to prepare functional plans for their respective program areas. There are 13 state functional plans that serve as the primary implementing vehicle for the goals, objectives and policies of the Hawai`i State Plan. The functional plans applicable to the proposed ATST project, along with each plan's applicable objectives, policies, and actions will be addressed in the Draft EIS.

3.2 APPROVALS AND PERMITS

Table 3 lists anticipated permits and approvals required for the proposed ATST.

Table 3. Possible Government Permit, Consultation, or Concurrence

	PERMIT, CONSULTATION OR CONCURRENCE	REGULATORY AGENCY
Federal	Air Quality Consultation	U. S. Environmental Protection Agency
	Informal consultation in accordance with Section 7, Endangered Species Act (ESA)	U.S. Fish and Wildlife Service
	Consultation in accordance with Section 106 of the National Historic Preservation Act (NHPA)	Dept. of Land and Natural Resources (DLNR) State Historic Preservation Office
	Determination under the Coastal Zone Management Permit (CZMP)	State Office of Planning
State of Hawai`i	Conservation District Use Permit	Dept. of Land and Natural Resources
	National Pollutant Discharge Elimination System (NPDES) Permit and Water Quality Consultation	Department of Health, Clean Water Branch
	Individual Wastewater System Approval	Department of Health, Wastewater Branch
	Oversized and Overweight Vehicles on State Highways Permit	Department of Transportation Highways Division

4.0 DESCRIPTION OF THE AFFECTED NATURAL ENVIRONMENT, POTENTIAL IMPACTS OF THE PROPOSED ACTION, AND MITIGATION MEASURES

This section describes the existing conditions of the physical or natural environment, preliminary evaluation of potential impacts of the proposed ATST project on the environment, and potential mitigative measures to minimize known impacts.

4.1 CLIMATOLOGY

Temperature data collected at Maui Space Surveillance Complex (MSSC) between 1985 and 1991 shows that the lowest 7-year monthly average temperatures is about 42°F. This usually occurs in December, January and February, and the highest 7-year monthly average temperatures of about 50°F occur in August. During the winter months, sub-freezing temperatures and frost are common at higher elevations with occasional sub-zero temperatures recorded during the winter months. Between December and February the summit area occasionally experiences snow, hail and sleet.

Rainfall on Haleakalā peaks in a band at elevations between 3,000 to 5,000 feet where the moisture-laden trade winds are cooled as they rise against the mountain front. At higher elevations, the air is much drier, resulting in average rainfall of less than 15 inches to greater than 45 inches a year.

Winds about Maui are predominantly northeasterly trade winds, spurred by high-pressure anticyclones and ridges that occur several hundred miles to the north and northeast of the island. These trade winds are most persistent during the months of March to November. Conversely, southwesterly (Kona) winds occasionally occur in the winter months, usually accompanied by clear weather. However, wind speeds at the summit can be extreme; the greatest wind speed recorded at the summit is over 125 miles per hour (mph). Gusts exceeding 60 mph are common throughout the year as are sustained winds of 50 mph. Winter storm systems from the North Pacific have been known to bring the strongest winds through the island chain.

Potential Impacts and Mitigative Measures

The proposed ATST project is not expected to have an impact on climatic conditions and no mitigative measures are planned.

4.2 TOPOGRAPHY

The island of Maui consists of two major volcanoes, West Maui and Haleakalā. While the older West Maui volcano appears to be extinct, Haleakalā volcano's last eruption was only two centuries ago, and the volcano is considered to be dormant.

Haleakalā is an oceanic type shield volcano that forms the eastern half of Maui, rising to an elevation of 10,023 feet above seal level (ASL). The summit area is rugged and barren,

consisting of lava and pyroclastic materials. Within a 4-mile radius of HO, the elevation drops to approximately 3,600 feet, with an average slope greater than 30 percent.

Potential Impacts and Mitigative Measures

The proposed ATST project is not expected to have an impact on the topography and no mitigative measures are planned.

4.3 GEOLOGY

Over the course of Haleakalā's formation, three distinct phases of eruption have taken place. The first, called the Honomanu Volcanic Series, is responsible for the formation of Haleakalā's primitive shield and most likely, its three prominent rift zones. Honomanu lavas are exposed over less than 1 percent of Haleakalā, but are believed to form the foundation of the entire mountain to an unknown depth below sea level. The second series, or Kula Volcanic Series, overlaid the previous Honomanu Series with its lava flows. Eruptions of this series were considerably more explosive than its predecessor, leading to the formation of most of the cinder cones along the three rift zones.

A period of inactivity followed the Kula Series, during which time erosion began to predominate the formation of Haleakalā crater by forming great valleys leading to the coast. After this long period of erosion, the final volcanic eruptions, called the Hana Volcanic Series, partially filled the deep valleys. Several cinder cones and ash deposits lined the East and Southwest Rift Zones ranging from a few feet high to large cones more than a mile across at the base and 600 feet high. Lava flows within the Haleakalā Southwest Rift Zone range from 200 to 20,000 years old. Six flows have erupted in this area within the last 1,000 years. During the latest eruption sometime between 1650 and 1790, lava emerged from two vents and flowed into La Perouse Bay, where a small peninsula was constructed.

Recent studies have indicated that Haleakalā volcano may still be active, in light of the numerous eruptions during the last 8,000 years (Bergmanis, E.C., J. M. Sinton and F. A. Trusdell, *Rejuvenated Volcanism Along the Southwest Rift Zone, East Maui, Hawaii*, Bull. Volcanol., 62, 239-255, 2000.)

The site of the proposed ATST construction consists of polygonal to sub-columnar lava horizons which are broken into large blocks along horizontal and vertical joints. The near horizontal ankaramite lava is ponded and agglutinated with spatter and some cinder as well (IfAs Haleakalā Long Range Development Plan (LRDP), Appendix A). Subsurface coring completed during the site selection phase of ATST indicates that these lava horizons are several feet thick and intermixed with cinder beds.

Potential Impacts and Mitigative Measures

The proposed ATST project is not expected to have an impact on the geology and no mitigative measures are planned.

4.4. SOILS

The summit area is covered with volcanic ejecta consisting of lava, cinder, and ash of the Kula and Hana Volcanic Series; there is no soil development in the immediate vicinity of HO. Soil development occurs with increased distance (greater than 1.5 miles) from the summit. Most of the area is situated on Cinder Land (rCl), which is thought to be of the Kula period of volcanism (U.S. Soil Conservation Service, 1972). A foundation investigation conducted in 1985 in the HO area revealed that the cinder in this area is underlain by 5 feet of volcanic clinker and 16 feet of volcanic cinder.

Potential Impacts and Mitigative Measures

The proposed ATST project is not expected to have a significant impact on the soils and no mitigative measures are planned.

4.5 NATURAL HAZARDS

Because the proposed ATST project site and the area within HO are located at approximately 10,000 feet ASL, it is free from flood hazards and coastal restrictions. Hurricanes, high winds, snow, ice, and extreme cold are potential natural hazards at the ATST site.

Potential Impacts and Mitigative Measures

The proposed ATST project is not expected to have an impact on natural hazards and no mitigative measures are planned.

4.6 FLORA

The vegetation type at Haleakalā Observatories is an *Argyroxiphium/Dubatia* alpine dry shrubland. Dry alpine shrublands are typically open communities, occurring at 3,000 to 3,400 m (9,842 to 11,155 ft) elevation, predominantly on barren cinders, with very sparse vegetation cover (LRDP Appendix B, Wagner et al. 1999). The substrate is a mixture of ash, cinders, pumice, and lava (MSSC 2002). The vegetation is sparse, from a near barren <1% cover to about 10% cover. The vegetation is also low, no more than one meter (3 ft) tall anywhere on the site. During the most recent survey conducted by Forest and Kim Starr in November 2002 (LRDP, Appendix B), a total of 32 plant species were observed. Of these, 11 (34%) were native and 21 (66%) were non-native.

Within the HO area there are two general types of land area: undisturbed and those where construction has occurred. Undisturbed areas are comprised of predominantly native plants including shrubs, herbs, and grasses. Three species of native ferns are found tucked into rock crevices and overhangs around the former LURE Observatory site and on the steep slopes on the southeast part of the property near the Mees Solar Observatory.

Areas of HO property where construction has occurred generally support fewer native species and contain more weeds. One notable exception is the endemic silversword or ʻahinahina

(*Argyroxiphium sandwicense* subsp. *macrocephalum*) which is found exclusively on areas where construction has occurred. The only "trees" found at HO were two unidentified pines (*Pinus* sp.) located between a weather station tower and the Mees Solar Observatory were about 20 cm tall and looked more like a small multi-branched shrub than a tree. This was the first record of pines on the summit of Haleakalā. It was not known if the trees were planted, arrived as contaminants in soil, or blew in on the wind. Though small, they appeared to be many years old. At the recommendation of the Friends of Haleakalā National Park, the trees were removed.

Potential Impacts and Mitigative Measures

Although the construction of the proposed ATST project will result in the removal of some vegetation, it is not expected to have any long-term impact on flora at the HO site and no mitigative measures are planned.

4.7 FAUNA

Faunal resources within Haleakalā Observatories consist of avifaunal species, invertebrates, and mammals. Each of these populations is described below.

4.7.1 ENDANGERED, THREATENED, LISTED, OR PROPOSED PLANT SPECIES

Haleakalā silverswords (*Argyroxiphium sandwicense* subsp. *macrocephalum*) are federally listed as a "threatened" species, meaning they may become endangered throughout all or a significant portion of their range if no protective measures are taken. Nine live silverswords and three dead silversword flower stalks were located within the HO property. None of the live or dead plants are located on or around the proposed ATST project site.

4.7.2 AVIFAUNAL RESOURCES

4.7.2.1 ʻUaʻu (Hawaiian Dark-rumped Petrel)

The ʻUaʻu, or Hawaiian Dark-rumped Petrel *(Pterodoma phaeopygia sandwichensis)*, is the only seabird that is federally listed. Most of the population is within National Park boundaries (Figure 8). About 55 burrows are within 1/4 mile (400 meters) of the Haleakalā Observatories, but outside National Park boundaries. These are considered part of the "Haleakalā population." Haleakalā National Park biologists have been conducting regular monitoring and searches of ʻUaʻu nests since 1988. The burrows immediately surrounding HO are shown in Figure 9, which was derived from data obtained during a 2003 survey conducted by the Haleakalā National Park.

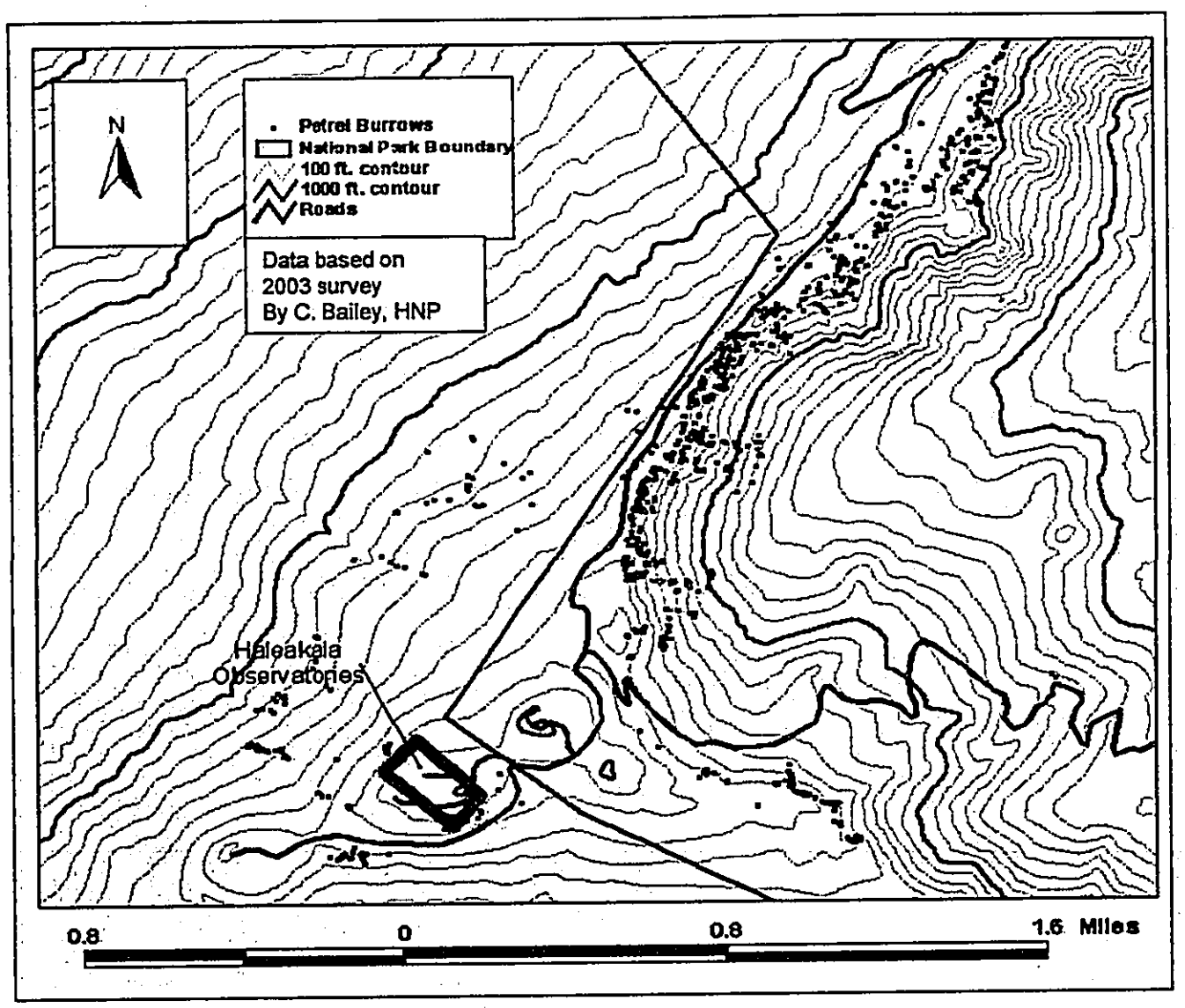


Figure 8. Petrel Burrows Within Two Miles of Haleakalā Observatories

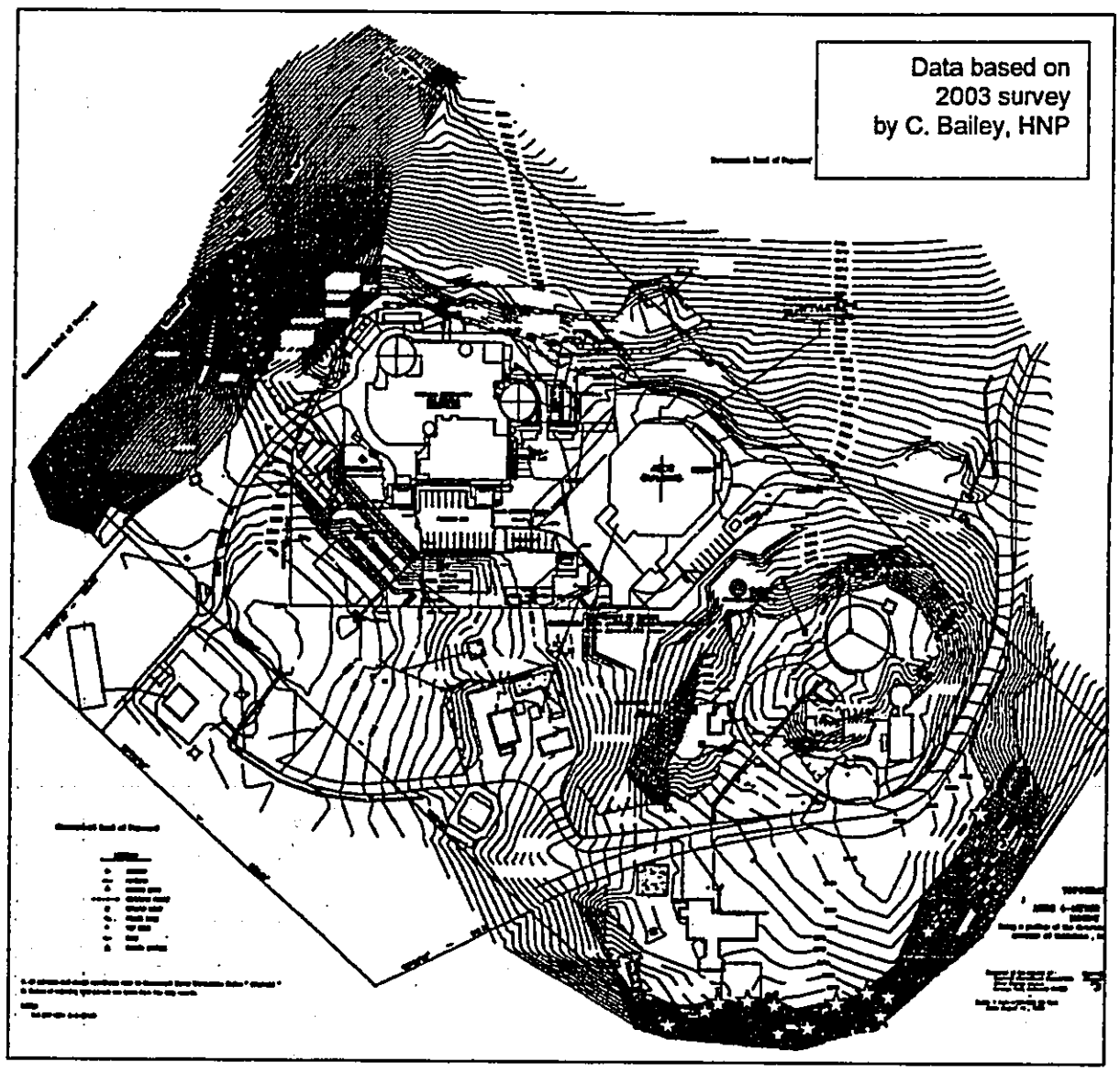


Figure 9. Petrel Burrows (yellow stars) Near Haleakalā Observatories Site

4.7.2.2 Nene (Hawaiian Goose)

The Hawaiian Nene (Branta sandvicensis or Nesochen sandvicensis), currently on the Federal List of Endangered Species, are found only in the Hawaiian Islands and are the only extant species of goose not occurring naturally in continental areas. The Hawaiian goose formerly bred on most of the Hawaiian Islands, but currently is restricted to the islands of Hawai'i, Kaua'i, and Maui. Preferred nest sites include sparsely to densely vegetated beach strands, shrublands, grasslands, and woodlands on well-drained soil, volcanic ash, cinder, and lava rock substrates. Nene typically feed on both native and introduced plants in the grasslands and slopes where it lives, but has been known to fly over Haleakalā Observatories, although the entire summit area is outside the known range of the bird.

4.7.2.3 *'Ope'ape'a* (Hawaiian Hoary Bat)

The Hawaiian Hoary Bat (*Lasiurus cinereus semotus*), known locally as the *'ope'ape'a,* was listed as an endangered species on October 13, 1970, under the Federal Endangered Species Act. A recovery plan was assigned to the Hawaiian Hoary Bat, which indicates it is a subspecies with moderate degree of threat and a high potential for recovery.

The nocturnal Hawaiian Hoary bat is the only existing native terrestrial mammal known to occur in the Hawaiian archipelago, although other bat species have been found in sub-fossil remains. According to the U. S. Fish and Wildlife Service, relatively little research has been conducted on this endemic Hawaiian bat and data regarding its habitat and population status are very limited. Most of the available documentation suggests that this elusive bat roosts among trees in areas near forests.

On Maui, the bat resides in the lowlands of the Haleakalā slopes. Even though several sightings have been reported near the Haleakalā Observatories, it is considered unlikely that the bat is a resident of the area, due to the relatively cold summit temperatures and the very low abundance of flying insects, the primary prey of the bat. The largest concentrations of bats are considered to occur on the islands of Hawai'i and Kaua'i.

4.7.2.4 Other Introduced Fauna

Other introduced fauna that could be observed within the summit area include the chukar (*Alectoris chukar*), the feral goat (*Capra hircus*), the Polynesian rat (*Rattus exulans)*, and the roof rat (*Rattus rattus*). The Indian mongoose (*Herpestes auropunctatus*) is occasionally observed on the summit. These species are not included on Federal or State threatened or endangered lists.

4.7.3 INVERTEBRATE RESOURCES

Due to the harsh environment, fewer insects are present at upper elevations on Haleakalā than are found in the warm, moist lowlands. However, an exceptional assemblage of insects and spiders make their home on the mountain's upper slopes. A survey and

inventory of arthropod fauna was conducted for the 18.166 acres of HO in 2003. The arthropod species that were collected during this study were typical of what has been found during previous studies. No species were found that are locally unique to the site, nor were there any species found whose habitat is threatened by normal observatory operations. Several species were added to the previous inventory site records.

The diversity of the arthropod fauna at HO is somewhat less than what has been reported in adjacent, undisturbed habitat. This is expected, in that buildings, roads, parking areas, and walkways occupy 40% of the site. However, the undisturbed habitat on the site that was sampled has an arthropod fauna generally similar to what could be expected from other sites on the volcano with similar undisturbed habitat. Most of the arthropods collected during the most recent study are largely associated with vegetation at the site. Observatory construction and operations have increased the suitability of some habitats for plants and increased vegetation has probably caused an increase in the populations of some native arthropod species.

Potential Impacts and Mitigative Measures

No impact is anticipated to most avifaunal resources at Kolekole. However, the proposed ATST project would be constructed close to a few of the currently identified `Ua`u burrows on the south slope of Kolekole. The EIS will investigate potential impacts to the `Ua`u during construction and operation of the proposed facility. Migitative measures may be necessary to prevent or limit impact to the birds or the burrows within the immediate vicinity of the proposed facility.

5.0 ASSESSMENT OF EXISTING HUMAN ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATIVE MEASURES

This section describes the existing conditions of the human environment, potential impacts of the proposed ATST project, and mitigative measures to minimize any impacts.

5.1 CULTURAL, HISTORIC, AND ARCHAEOLOGICAL RESOURCES

5.1.1 CULTURAL RESOURCES

The cultural resources of Kolekole date back more than a thousand years and are an integral part of the Hawaiian culture, both past and present. In ancient times, commoners could not even walk on the summit because it belonged to the gods. The sacred class of na poāo kāhuna (priest) used the summit area as a learning center. It was a place where the kāhuna could absorb the tones of ancient prayer and balance within the vortex of energy, for spiritual manifestations, the art of healing, and for navigation. Kolekole itself was a very special religious place used by the kāhuna po`o as a training site in the arts. There were numerous gods and goddesses said to reside on the summit, in the crater, and all around the mountain.

Haleakalā Crater was used as a trans-Maui thoroughfare and source for basalt stones. There are specific teachings related by the kupuna (Elders) that guided commoners who were permitted access for gathering stones and to bury the dead. Numerous archaeological sites have been recorded on the crest and in the crater, including, in order of frequency, temporary shelters, cairns, platforms with presumed religious purposes, adze quarries and workshops, caves, and trails (LRDP, Appendix H, Rosendahl, 1978). These are all remnants of the very elaborate spiritual and cultural life that the kanaka maoli (indigenous Hawaiian people) focused around the summit area.

Within Kolekole, cultural resources of importance are: temporary habitation or wind shelters, two petroglyph images, one site interpreted as a possible burial, and two ceremonial sites. The sites are important in that they have yielded information on prehistory. Native Hawaiians know that this area provides significant cultural value as a remnant of a Native Hawaiian landscape because of its ceremonial and traditional importance.

5.1.2 TRADITIONAL PRACTICES

During preparation of a Traditional Practices Assessment in 2002, it was understood that due to the construction of former and existing buildings over the past 70+ years, much of the physical evidence of ancient Hawaiian traditional and cultural practices in the area was destroyed.

However, as shown in oli (chants) and the mo`olelo (stories) about the summit of Haleakalā, the area around Kolekole was used for a training ground in the arts of reading the stars and being one with the celestial entities above and was considered sacred

because of its height and closeness to the heavens. Evidence of sacred use found within HO includes ceremonial rock formations and temporary habitation shelters possibly used for ceremonies by the priesthood or for conducting initiation rites and practices. Traditional accounts also exist of the use of Haleakalā in rites of passage such as birth and death.

Haleakalā has long been recognized as a traditional traveling route thru East Maui. In the sixteenth century a high chief constructed a trail around the island and over Haleakalā, uniting politically important districts. Peoples of Honua`lua buried their dead in Haleakalā Crater and several references specify burials of both chiefs and commoners in Haleakalā Crater; and one possible burial is recorded on the northwest boundary of HO property.

Today, spiritual practices continue in and around Kolekole. Flora and fauna are still collected for hula adornment by Kumu Hula (hula teacher), and native Hawaiians frequent the site for sunrise or sunset practices. The mana (spirit) of the area is wholly dependent on the vistas that can be viewed and the connection with earth and sky. For example, Native Hawaiians know that the spiritual essence is not something tangible at the summit area, but that one can feel the presence of the gods.

5.1.3 ARCHAEOLOGICAL INVENTORY

A comprehensive archaeological inventory survey of HO was completed in fall of 2002. Whereas surveys had previously been conducted for specific construction projects within HO, and a number of archaeological features had been identified (LRDP, Appendix H, Bushnell & Hammatt, 2000, J. C. Chatters, 1991), the most recent survey of the entire 18.166 acres was exhaustive and included location and description of six previously unidentified sites within the HO property. These sites were assigned State designations and, in addition, further documentation was obtained for four previously identified sites that were listed with the State Historic Preservation Division Maui Office. In total, twenty-nine new features were identified and five excavation units were utilized to sample selected features that were located in some of the previously undocumented sites.

Most of the newly identified features are temporary habitation areas or wind shelters. Two features at one site are petroglyph images and, as indicated above, one new site is interpreted as a possible burial. Two small platforms thought to have ceremonial functions were also identified, as was a possible trail segment. All of the newly identified sites and previously designated ones retain their significance rating under at least Criterion "d" for their information content under Federal and State historic preservation guidelines. The general lack of material culture remains suggests that the area comprising HO was utilized for short-term shelter purposes, rather than extended periods of temporary habitation use. While there was no charcoal located during testing in the project area, the newly identified sites are nevertheless tentatively interpreted as indigenous cultural resources, some of which may have been modified and/or used in modern times.

Potential Impacts and Mitigative Measures

The proposed ATST project is not expected to have an impact on cultural resources at Kolekole. A site-specific archaeological survey will be conducted for the EIS to ensure that no previously unidentified cultural resources would be impacted by construction and operation of the proposed facility. In addition, a cultural resource evaluation and traditional practices assessment will be completed that will expand upon the documentation provided for the LRDP.

5.2 ROADWAYS AND TRAFFIC

Presently, only one road exists to the summit of Haleakalā. Various route options to the summit intersect in Kula from which a single two-lane county and state-maintained road ascends to Haleakalā National Park (HNP), which continues as a two-lane thoroughfare owned and maintained by HNP. The road continues to the park boundary adjacent to the HO area. The Federal Aviation Administration (FAA) maintains an exclusive access road to facilities in the Saddle Area and the FAA Low Site. Visitors to HNP generate most of the traffic on Haleakalā Crater Road, with the highest traffic volumes occurring in the early morning hours when visitors experience the picturesque sunrise. The high elevations, relatively steep grades, and numerous switchback curves on the road limit vehicle speeds, particularly those of trucks and tour buses.

The unimproved access road known as Skyline Drive originates at the Saddle Area and traverses the Southwest Rift zone, ultimately leading to Polipoli State Park. Its entire length is located on State land within the Forest Reserve, with approximately half of it in the Limited Subzone of the State Conservation District and the remaining half in the Resource Subzone (Figure 7). A locked gate near the Saddle Area restricts vehicle access to the road from the Haleakalā summit to those holding DLNR permits. Hikers, hunters, and Haleakalā National Park personnel primarily use the unpaved road. Slopes along the existing road range from flat to 28 percent. The surface area consists of small lava cinder rock from which the small particulate resulting from weathering over time has been washed to a level approximately three feet below the surface.

Potential Impacts and Mitigative Measures

The proposed ATST project is not expected to impact traffic to and from Haleakalā National Park or the upcountry area. Public and county concerns that have been expressed about traffic safety during construction and operations will be addressed in the EIS.

5.3 NOISE

Existing noise levels at the summit are low, with wind noise accounting for the majority of background noise. Vehicles accessing the summit, air conditioning compressors and exhaust fans are the loudest noise sources. Spot measurements made at the MSSC site on a day with moderate wind speeds indicated instantaneous noise levels on the order of 45 to 50 dBA. Certain equipment used at HO does produce intermittent noise at levels higher than that at a distance of 50 feet. For example, testing the diesel-powered, emergency generator at the Air Force facilities could raise the noise level to 75 to 80 dBA at a distance of 50 feet. However, tests on this type of equipment rarely last more than an hour.

Potential Impacts and Mitigative Measures

The proposed ATST facility is not expected to have a significant impact on existing noise levels at the summit area. A small utility building planned for the ATST containing cooling equipment would emit noise at levels that will be evaluated in the EIS for any potential impacts on wildlife or human habitation. If necessary, noise mitigation measures will be described in the EIS for exhaust fans, motors, etc., such that noise exposure from the utility building would not endanger the health or activities of wildlife or human activities.

5.4 AIR QUALITY

Air quality near the summit of Haleakalā is excellent due to the lack of nearby major stationary sources of emissions, few mobile emission sources (vehicles, etc.), favorable topography and the persistent tradewinds. It is in an attainment area for U.S. Environmental Protection Agency (EPA) "criteria" pollutants. In addition, Haleakalā is one of the few places in the state designated as a "Class 1" area (most restrictive) with respect to the EPAs "Prevention of Significant Deterioration (PSD)" regulations. These regulations are designed to maintain air quality in areas that are currently in attainment.

Potential Impacts and Mitigative Measures

The proposed ATST project is not expected to impact air quality. During construction, fugitive dust will be controlled in accordance with the procedures imposed by the LRDP on construction at HO. ATST operations would not involve release of hazardous materials into the environment.

Criteria and hazardous air emissions would occur with the proposed ATST, but would be small and temporary or small and negligible. Criteria air pollutants would be emitted from construction-related equipment, vehicles, and site development activities. Equipment would include mobile source emissions from cranes and possibly generators to power other construction-related equipment. These emissions, plus the tail-pipe emissions from construction-related vehicles, would be temporary and would not significantly impact air quality.

Site development activities are likely to generate fugitive dust. To minimize fugitive dust emissions as required by HAR 11-60.1-33, reasonable precautions would be taken to minimize fugitive dust (e.g., the application of water and the covering of moving, open-bodied trucks containing materials that could result in fugitive dust). Water would be applied to exposed ground surface to suppress dust; however, amounts would be minimal and would infiltrate or evaporate and not result in runoff.

For the proposed project, mirror stripping operations and restoration of the reflective surface, via vapor deposition would occur once every few years at ATST. Small quantities of hazardous air pollutant emissions could be released during stripping operations for the primary mirror, but it is anticipated that these would be exempt from permitting, as specified in HAR Title 11, Chapter 60.1-62(d). There are no emissions of hazardous air pollutants associated with the vapor deposition process.

5.5 VISUAL RESOURCES

More than a million visitors annually are attracted to Haleakalā's various lookouts and vantage points for its spectacular vistas and astronomical views. Looking down the slopes to the west, a majestic view of Maui's isthmus and West Maui Mountains is afforded, while to the east are the richly colored scenes of the crater and, on minimal cloud-cover days, the slopes of Mauna Kea and Mauna Loa.

On a cloudless night, Haleakalā also serves as an outstanding platform from which to view the heavens, facilitated by its position above the cloud inversion layer, the clean atmosphere, and the lack of degrading light sources. Because Haleakalā is blanketed with dark-hued cinders and ash, and lacks vegetation, its appearance contrasts sharply with the lush tropical forests found at lower elevations. When mid- and upper-level cloud cover is absent, many of the existing structures at HO are visible from miles away. Some of the facilities can also be seen from public viewpoints and highways that climb the slopes of the mountain (UH IfA, 1994). The domes of some of the existing facilities within HO are painted white, while others are aluminized.

Potential Impacts and Mitigative Measures

The proposed ATST project is expected to have an impact on the visual resources of Haleakalā. Because it will operate during the daytime when ground heating and turbulence is at a maximum, the proposed ATST would be painted white, as are all other solar telescope facilities, and it would need to be placed above the turbulent boundary layer on the ground.

The proposed ATST enclosure would have a large surface area exposed to solar radiation. Left uncooled and painted other than white, the skin surface would rise to a temperature some tens of degrees above the ambient air temperature. This would result in rising bubbles of warm air that cause intolerably large thermal image degradation ("seeing"). Design analyses show that the enclosure skin temperature must be kept at or slightly below ambient air temperature to minimize these effects, so that critical scientific objectives to achieve deliverable image quality can be met.

Two features of the enclosure skin design would accomplish these cooling requirements. First, recirculating cold liquid through plate coils covering the critical areas of the skin would chill the enclosure. Second, the enclosure skin would be painted with white dioxide paint, which absorbs only a small amount of heat from the sun. Other colors have been investigated, but the heat loading for any color other than that of the special white dioxide paint would involve a minimum of four times the power consumption for cooling than for a white exterior. Power consumption at the summit and on Maui is of concern and therefore the designers wish to minimize overall power requirements for this proposed project.

Finally, ground level turbulence during the daytime also dictates that the telescope be placed above as much of the turbulent boundary layer as possible to obtain the optical "seeing" necessary to achieve the scientific objectives of the project. Therefore, the overall height of the proposed ATST facility would be as much as 143 ft above ground level.

At the primary or preferred site for the proposed ATST (just east of the Mees Observatory) and the alternative site at Reber Circle, the facility would be visible from the nearest public viewpoints of the HO complex. For example, the ATST would be visible at the Haleakalā National Park's Pu`u Ula`ula (Red Hill) Overlook (Figure 10).

In addition, depending on cloud-free line-of-sight weather conditions, the proposed ATST would be visible from various communities on Maui as part of the complex of HO facilities. Visibility of the summit area would be more likely in the early morning, before the daytime cloud inversion layer builds up, and in the late afternoon after the inversion layer dissipates. For example, the proposed ATST at either primary or alternative sites may be seen from Wailuku and Pukalani (Figures 11 and 12), although terrain and other facilities would partly obscure the proposed facility (Figure 12). The EIS will fully address the view planes along which ATST would be visible and will provide complete information on potential visual impacts from this project.

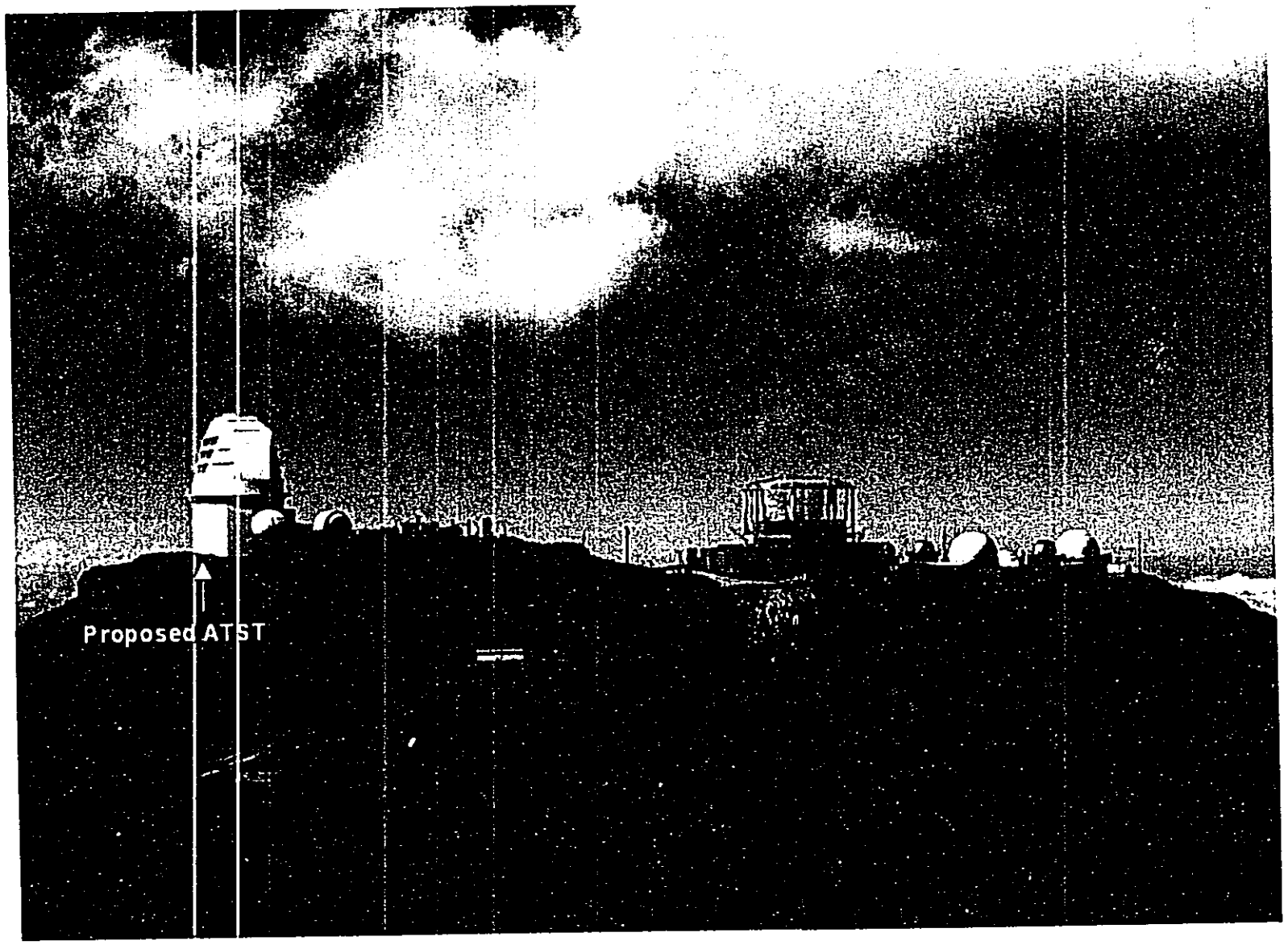
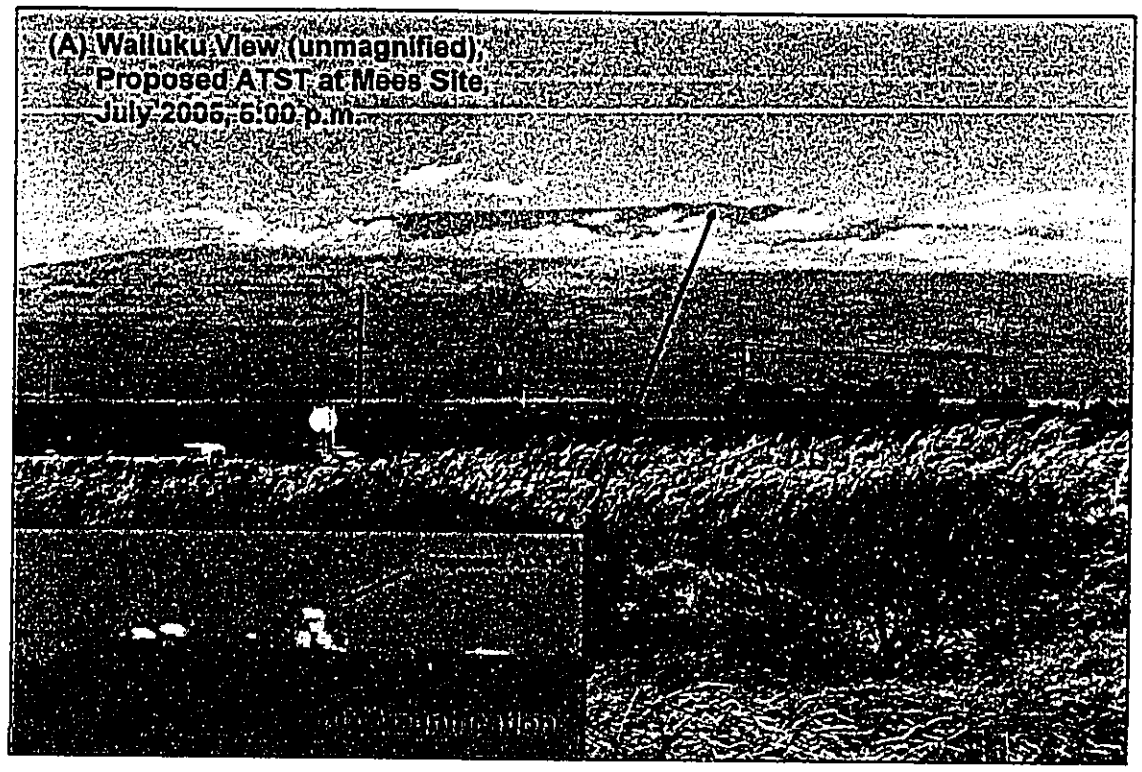


Figure 10. Proposed ATST As It Would Appear From Red Hill (Pu`u Ula`ula) Overlook



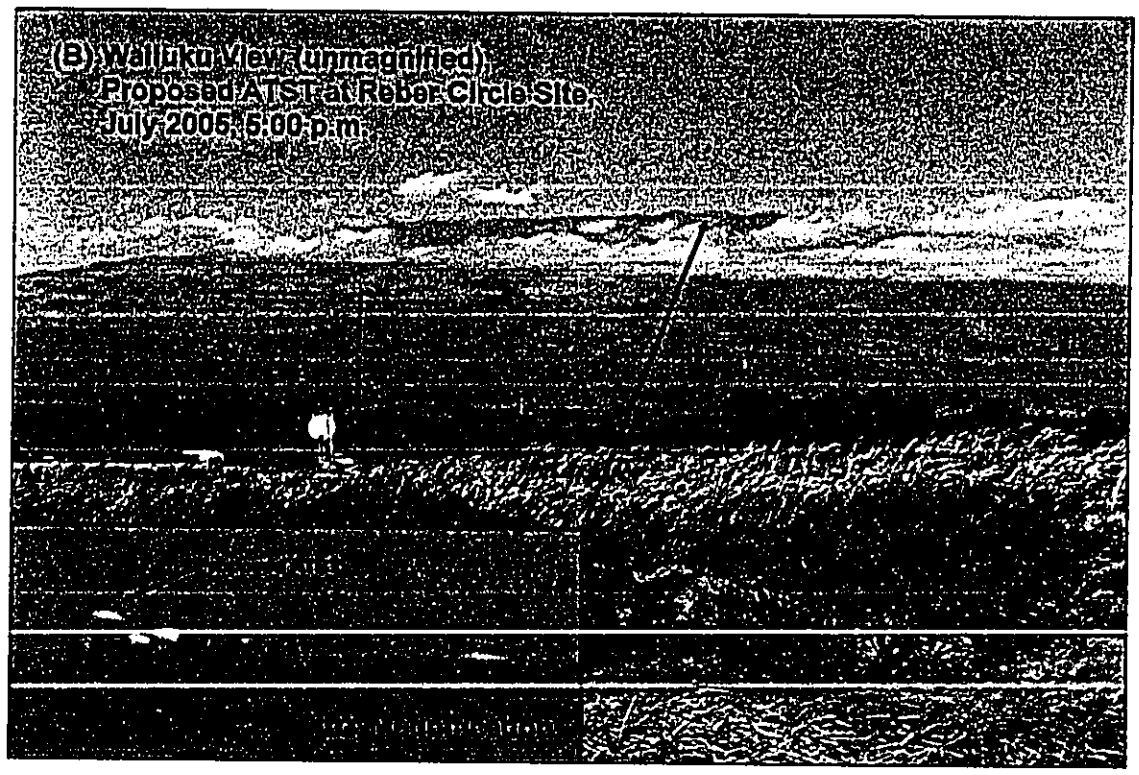
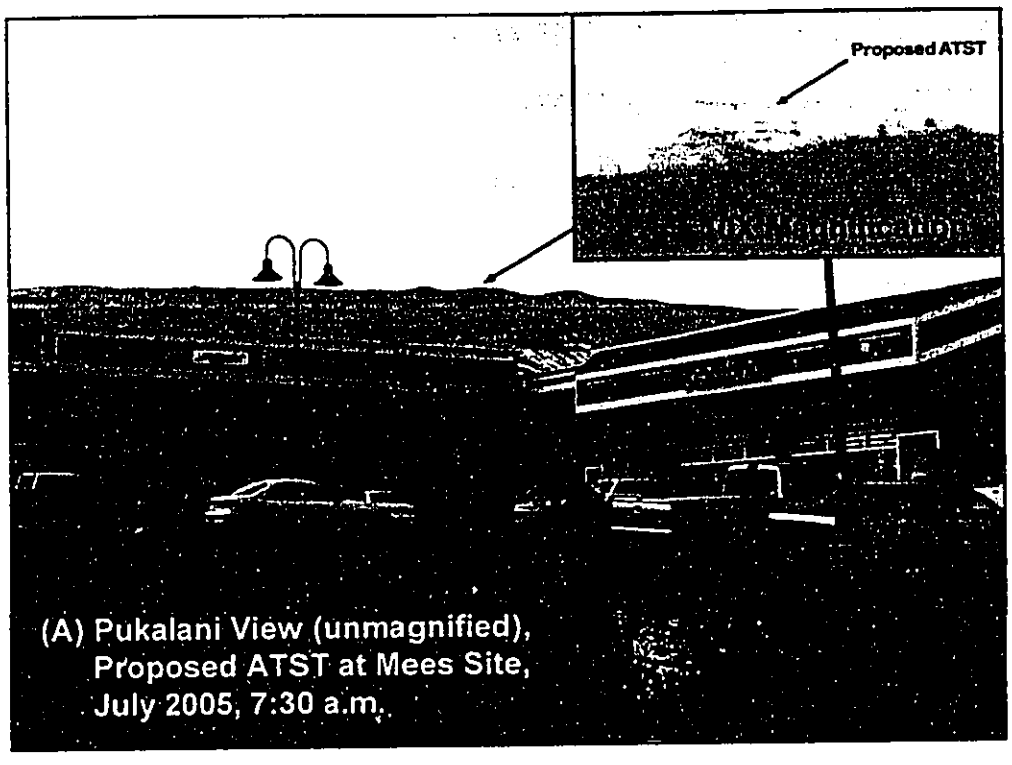


Figure 11. Proposed ATST As It Would Appear From High Street And Kuikahi Drive In Wailuku



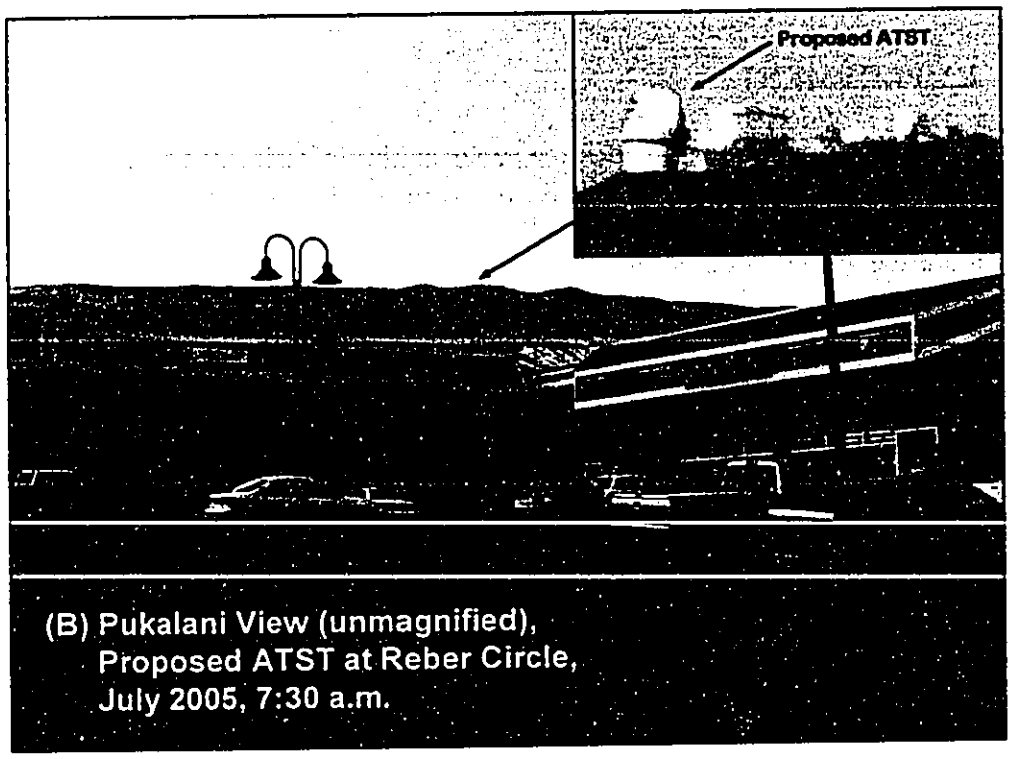
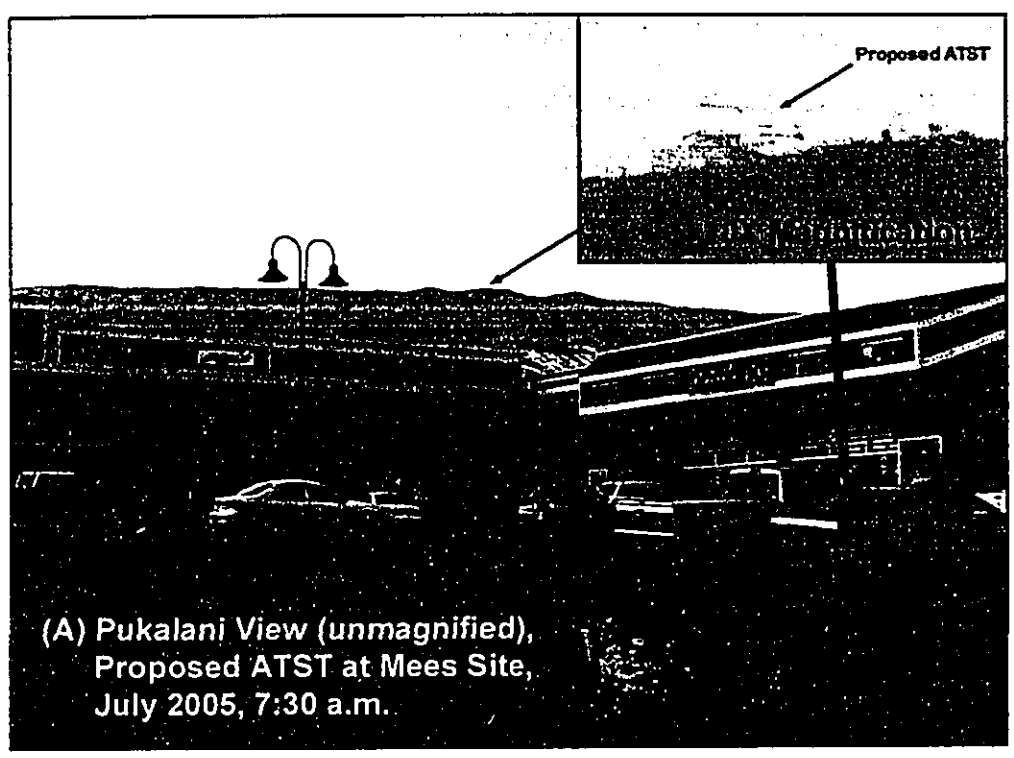


Figure 12. Proposed ATST As It Would Appear From Pukalani Terrace Shopping Center



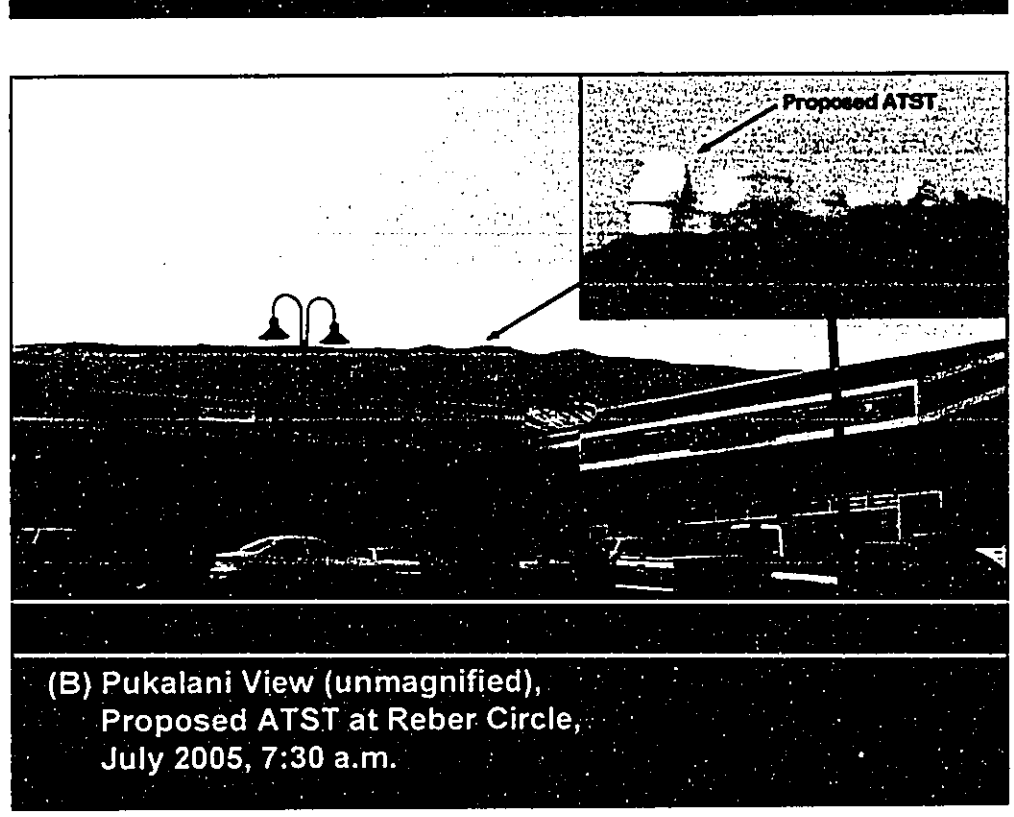


Figure 12. Proposed ATST As It Would Appear From Pukalani Terrace Shopping Center

5.6 SOCIAL AND ECONOMIC CHARACTERISTICS

5.6.1 POPULATION AND HOUSING

The proposed ATST project would be located in a Conservation District where no urban or rural population and housing is allowed.

Although many visitors are attracted to the summit and crater area, the HO site has a posted sign indicating the area is off limits to unauthorized personnel. The only people who would occupy the HO site and proposed ATST project area would be personnel employed by the various facilities within the HO complex.

The staff and visiting scientists for ATST would likely number as many as 40 to 50 at any one time, and therefore both temporary and permanent housing for these individuals would be required.

Potential Impacts and Mitigative Measures

The proposed ATST project would require housing for a permanent staff of about 30 individuals by 2012, which is anticipated to have a small impact on the Maui housing market, relative to the total influx of new residents to Maui, which has averaged approximately 1,000 a year since 1998 (Maui County Data Book).

5.6.2 EMPLOYMENT

The current daily operational workforce level at the HO site averages from 15 to 30 individuals, including technicians, science team members, and facilities staff. The proposed ATST project would be locally operated, and the primary onsite activities would require a staff of trained individuals ranging from engineers of varied disciplines, optics and software specialists, and technicians. Based on current plans, the average work force is anticipated to be about 6 staff per day at the site and as many as 25 to 30 more scientists, engineers, and support staff at other locations on Maui.

Potential Impacts and Mitigative Measures

The proposed ATST project is expected to have a beneficial impact on the Maui employment statistics. As many technical and support positions as possible would be filled from the growing number of available qualified Maui-based individuals.

5.7 INFRASTRUCTURE AND UTILITIES

5.7.1 WATER

There is no source or supply of water at the summit area of Haleakalā. At various times during the year (particularly the winter months), rainwater is collected from building roofs, etc., and stored in water-catchment systems. To supplement this source, water is

trucked to each user in certified tanks where it is stored on-site. Users maintain their own collection systems and storage tanks for potable and/or non-potable water, as well as their individual pumping and distribution systems.

Surface Water

Most streams on Haleakalā are intermittent because of the steep, permeable lava terrain. The nearest intermittent streams are located approximately 3 kilometers (1.9 miles) downslope of MSSC. Perennial streams that do exist occur at low elevations and originate from groundwater springs. No perennial streams or other surface water bodies are located within a 6.4-kilometer (4-mile) radius of the HO complex. The highly permeable cinder material at the summit promotes infiltration of storm water.

Groundwater

The proposed ATST is located near the division of two groundwater aquifer sectors and four aquifer systems (Mink, John F. and L. Stephen Lau. February 1990. *Aquifer Identification and Classification for Maui: Groundwater Protection Strategy for Hawai'i No. 185*). A sector is a large region with hydrogeological similarities that primarily reflects broad hydrogeological features, and secondarily, geography. A system is an area within a sector showing hydrogeological continuity. The groundwater resources below the proposed ATST are characterized as part of the Kamaole system of the Central sector. The characteristics of the groundwater beneath the proposed ATST are the same as those of the nearby systems and sectors. A high level, unconfined, perched aquifer exists above a high level, unconfined aquifer in dike compartments. (High-level aquifers are those where fresh water is not in contact with seawater.)

In unconfined aquifers, the water table is the upper surface of the saturated aquifer. A perched aquifer is contained above an impermeable layer. Groundwater in both the upper and lower aquifers was identified as fresh water (containing less than 250 milligrams per liter of chloride [mg/L Cl^-]) that has the potential for future use as drinking water, but was not being used when the aquifer was classified. The upper aquifer is classified as being replaceable and highly vulnerable to contamination, while the lower dike aquifers are classified as being irreplaceable and moderately vulnerable to contamination. There are no drinking water wells within 17.7 kilometers (11 miles) of the summit.

Potential Impacts and Mitigative Measures

The proposed ATST project would not have an impact on groundwater sources or supplies. The facility is expected to share catchment water with the Mees Observatory and also to augment as required with trucked-in potable water. Water will be stored in an existing or new cistern adjacent to the facility and treated as required for human consumption.

5.7.2 SOLID WASTE AND SEWERAGE

Septic tanks are the primary means of sewage disposal within the summit area. There is no central waste/sewage collection or storage system at the Haleakalā summit. Each user provides for the collection and proper storage of wastewater and sewage generated by that site.

Trash collection is the responsibility of building maintenance personnel for each facility located within the HO complex. Non-hazardous trash is disposed of off-site in a licensed landfill, with computer paper and aluminum being recycled. Hazardous wastes and petroleum product wastes are segregated at the generation point and handled separately.

Potential Impacts and Mitigative Measures

The Draft EIS will include information on solid waste and wastewater disposal facilities and the impact, if any, of the proposed ATST project alternatives on landfill capacity.

5.7.3 DRAINAGE SYSTEM

On the slopes of Haleakalā, virtually all precipitation will infiltrate into the soil profile. Once in the soil, gravity continues to force the water down into the soil. When the water hits a less permeable layer, such as basalt, it will flow in the path of least resistance. At the HO site, this confining layer of basalt ranges from depths of 5-20+ feet. The significance of a confining layer of basalt near the summit area is that all precipitation falling near the summit is infiltrated and flows subsurface toward the natural drainage courses such as Hanawainui gulch. As a result, runoff from the impervious surfaces associated with HO facilities and adjacent roads may not increase the total volume of stormwater flow entering natural drainages, but may only affect the way it is transported there (Haleakalā High Altitude Observatory, Stormwater Erosion Report, Tetra Tech, 2005.)

Potential Impacts and Mitigative Measures

A majority of the HO site is served by a stormwater collection system of paved channels designed to convey runoff from impervious areas to a central infiltration basin. The ATST facility design will include stormwater drainage capacity and configuration that would tie it into the drainage system for HO. The EIS will use the information being obtained from the Storm Water Management Plan surveys currently underway for HO to assess whether the current drainage system is adequate for ATST or whether new channels and infiltration basins will be needed to prevent drainage water from seeking new paths to the natural drainage areas through erosion of the topography on and around Kolekole. The EIS will fully describe potential impacts from stormwater runoff associated with the proposed ATST, and the mitigations necessary to maintain erosion control for HO and the areas immediately adjacent to the site. The objective will be to prevent erosion that would be exclusively from new impervious surfaces associated with ATST, and to maintain management of storm water at HO.

5.7.4 ELECTRICAL AND COMMUNICATIONS SYSTEMS

Maui Electric Co. (MECO) generates electricity and Hawaiian Telcom (formerly Verizon Hawai'i) provides telephone and other communications services for the Haleakalā Observatories complex. The details of the electrical and communications systems will be described in the Draft EIS.

Potential Impacts and Mitigative Measures

All utilities and infrastructure related to electrical and communications systems for the proposed ATST project would be installed underground. This will reduce visual and safety impacts that would have resulted from overhead utilities.

Power requirements for ATST will be fully discussed in the EIS, as well as MECOs plans for upgrading the current capacity at the site to avoid impact to other summit users.

5.8 PUBLIC SERVICES AND FACILITIES

5.8.1 POLICE PROTECTION

The closest Maui Police Department substation is located in Makawao approximately 29 miles from the summit of Haleakalā. The main station and administrative headquarters is located in Kahului. A new police substation currently being completed is located in Kula, which is the community closest to the summit but still approximately 22 miles away. In addition, police radio transmitters are located on property adjacent to HO.

Potential Impacts and Mitigative Measures

Due to its proposed location, impacts to police services from the proposed ATST project are not anticipated to be significant. It is not anticipated that ATST will have any impact on police radio transmissions from the summit area, and the EIS will address police concerns about future power availability for those transmissions and non-interference with police frequencies.

5.8.2 FIRE PROTECTION

The closest Maui Fire Department Fire Station is located in Kula approximately 28 miles away from the summit of Haleakalā. Another Fire Station serving the Upcountry community is located in Makawao approximately 29 miles from the summit.

Potential Impacts and Mitigative Measures

Due to its proposed location, impacts to fire services from the proposed ATST project are not anticipated to be significant.

5.8.3 SCHOOLS

The closest school is located in the Kula community (Haleakalā Waldorf School) and is approximately 27 miles from the summit of Haleakalā.

Potential Impacts and Mitigative Measures

Due to its proposed location, impacts to schools from the proposed ATST project are not anticipated to be significant.

5.8.4 RECREATIONAL FACILITIES

The Haleakalā Visitor Center of Haleakalā National Park is located approximately 0.5 miles east of HO and is one of the main points of attraction for visitors of the mountain. Besides boasting a magnificent view of the crater, the Visitor Center also details the geology, archaeology, and ecology of the area as well as the wilderness protection programs in exhibits posted throughout the area. Overlooks with orientation panels and descriptive displays are located at Leleiwi, Kalahaku, and Pu`u Ula`ula (Red Hill) along the park road between park headquarters and the summit. The rare silversword plant that can be seen at Kalahaku draws many nature enthusiasts.

Many visitors are attracted to the summit and crater area, because of the excellent walking and hiking opportunities available. Hikes can range from short self-guiding walks to rigorous backpacking for several days. Camping is permitted at designated areas inside the crater floor. Camp and picnic sites are available in the Park, while public cabins are available for campers in the crater. In addition, concessionaires sponsor their own trips through the crater on a one-day or overnight basis. Hikers have also been known to traverse the trails found near the proposed site at Kalepeamoa. The Skyline Trail begins at the 9,750-foot elevation at the lowest point of the paved access road near the Saddle Area and continues for about 6.5 miles, ending at the Polipoli Spring State Recreation Area. Trails through the area are open to the public for hiking and related recreational activities except during times of extreme fire danger.

Potential Impacts and Mitigative Measures

The proposed ATST project is not expected to have any impact on recreational facilities at Haleakalā. While visitors to the Visitor Center would be able to see ATST among the other HO facilities from the parking area of the visitor center and from the Pu`u Ula`ula overlook, the proposed project will not interfere with the view of the crater or other vistas in the summit area. The facility would not be visible from the crater, due to terrain between the proposed facility and the crater wall. The few vehicles traveling to the proposed ATST each day will not add significantly to the hundreds of vehicles entering Haleakalā National Park daily. Construction activities that may involve slow vehicular traffic will be described in the EIS, along with mitigation measures for potential interference with visitor and emergency vehicle traffic.

5.8.5 HEALTHCARE SERVICES

Maui Memorial Hospital, located in Wailuku, is the only full-service hospital on Maui. The Kula Hospital, located in Keokea, is approximately 40 miles from the summit. The Kula Hospital has no emergency services and is a chronic care facility. Emergency medical service stations are located in Kula and Makawao, which dispatch emergency medical care.

Potential Impacts and Mitigative Measures

Due to its proposed location, impacts to healthcare services from the proposed ATST project are not anticipated to be significant.

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6.0 ALTERNATIVES TO THE PROPOSED ACTION

In compliance with the provisions of Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules, Section 11-200-17(f), the following is a discussion of the alternatives to the use of the site for the proposed ATST project.

A panel of solar scientists and other experts examined 72 potential sites around the world that met initial criteria for a solar observatory. The list was reduced to six potential candidate sites and many months of scientific surveys were conducted at these sites to establish hours of sunlight, coronal visibility, astronomical "seeing", dust, logistics, and other considerations.

Haleakalā was selected as the only site which meets all the criteria for the scientific objectives for this project.

The possible alternatives to the proposed plan, including the "no-action" alternative, will be investigated to identify other potential land uses which might be appropriate on the property relative to existing environmental and socioeconomic conditions.

6.1 NO-ACTION ALTERNATIVE

Under the "no-action" alternative, the proposed project area would remain in its current undeveloped state and continue to not be utilized within the Conservation District of HO. The "no-action" alternative would limit solar astronomy to current technologies. Sophisticated theories and models would continue to await critical observational tests. Since existing instrumental capabilities at facilities such as the Mees Solar Observatory no longer are sufficient to meet this challenge, understanding the fundamental physical processes that govern the behavior of the Sun and therefore much of the climate of Earth would not be forthcoming.

6.2 REBER CIRCLE SITE ALTERNATIVE

An alternative to building the proposed ATST project at the Mees site would be to construct the ATST on what was the former location of a radio telescope in the early 1950s. This site at HO, informally named Reber Circle after the astronomer Grote Reber, is approximately 400 feet north of the primary proposed site (Figure 5). The EIS will address all the environmental conditions at the proposed alternative site and potential impacts that would occur should the ATST be constructed at that location.

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7.0 FINDINGS AND DETERMINATION

While this EISPN is preliminary to the Draft EIS, the currently known information presented here has been evaluated according to the significance criteria as set forth in Section 200, Title 11, State of Hawai'i Department of Health Rules. As a result of this preliminary information, it is anticipated that the proposed ATST project:

1. Is not likely to involve an irrevocable commitment to loss or destruction of any natural or cultural resource,

2. Would not curtail the range of beneficial uses of the environment,

3. Will not conflict with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders,

4. Would not substantially affect the economic or social welfare of the state,

5. Will not substantially affect public health,

6. Will not involve substantial secondary impacts, such as population changes or effects on public facilities,

7. Will not involve a substantial degradation of environmental quality,

8. Will be individually limited and will not cumulatively have considerable effect upon the environment or involve a commitment for larger actions,

9. Is not anticipated to substantially affect a rare, threatened, or endangered species, or its habitats,

10. Will not detrimentally affect air or water quality or ambient noise levels,

11 Will not affect, or likely to suffer damage, by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land unless the volcano erupts, estuary, fresh water, or coastal waters,

12. Will potentially affect scenic vistas and view planes identified in county or state plans or studies; or,

13. May result in a substantial fraction of the energy consumption at HO.

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8.0 CONSULTATION

8.1 PRE-ASSESSMENT CONSULTATION

In the course of planning the proposed ATST project with HO or in the course of preparing studies or submitting applications for various approvals for the project, the agencies, individuals, and organizations listed in Table 4 have been contacted or consulted during the pre-assessment phase of the EIS Preparation Notice.

Table 4. Pre-assessment Consultation List

FEDERAL	Advisory Council on Historic Preservation, Council on Environmental Quality
	Department of Energy
	Department of Interior, Fish and Wildlife Service
	Federal Aviation Administration
	Haleakalā National Park Service
	National Weather Service/NOAA
	U. S. Environmental Protection Agency, Pacific Islands Contact Office, Region 9
STATE OF HAWAI'I	Department of Accounting and General Services Public Works
	Department of Business, Economic Development and Tourism, Office of Planning, Land Use Division
	Dept. of Hawaiian Homelands, Land Management Division (Non-Homestead)
	Dept. of Land and Natural Resources: Division of Forestry and Wildlife, Land Division, Office of Conservation and Coastal Lands, and Island Burial Council
	State Historic Preservation Division
	Department of Transportation
	Office of Hawaiian Affairs
MAUI COUNTY	County of Maui, Dept. of Planning
	Maui County Cultural Resources Commission
	County of Maui, Dept. of Parks and Recreation
	Maui County Chief of Police
	Maui County Police Dept. Telecommunications
	Maui Economic and Development Board, High Tech Maui
POLITICAL FIGURES	U. S. Senator Daniel Akaka
	U. S. Senator Daniel Inouye
	U. S. House of Representatives, Congressman Neil Abercrombie
	U. S. House of Representatives, Congressman Ed Case
	Hawai'i State Senator Rosalyn Baker
	Hawai'i State Senator Mele Carroll
	Hawai'i State Senator J. Kalani English
	Hawai'i State Senator Chris Halford
	Hawai'i State Senator Kyle Yamashita
	Governor Linda Lingle
	Maui County Mayor Alan Arakawa
	County of Maui, Council Member Robert Carroll
	County of Maui, Council Member Mike Molina
	County of Maui, Council Member Charmaine Tavares

Table 4. Pre-assessment Consultation List (continued)

COMMUNITY ORGANIZATIONS AND HO NEIGHBORS	Air Force Maui Optical Supercomputing Site
	Boeing LTS, L&EOS Hawai'i
	Friends of Haleakalā
	Hawaii Telecom
	Kula Community Association
	Maui Electric Company, Inc.
	Maui Na Ala Hele Advisory Council
	Maui Outdoor Circle
	Raycom Media, Inc.
	Sandia Laboratories
	Sierra Club, Maui
	The Nature Conservancy
INDIVIDUALS	Kupuna Diana Amadeo
	David Dutro
	Ali'i Sir William Garcia, Royal Order of Kamehameha
	Issac Hall, Attorney
	Dana Hall, Hui Ala Nui O Makena
	Elizabeth Han
	Hokulani Holt-Padilla
	Sol Kahoohalahala, Kahoolawe Island Reserve Commission
	Leslie Kuloloio
	John Lind
	Tweetie Lind
	Charles Maxwell, Sr.
	Clifford Naeole
	Patty Nishiyama
	Edward Uwekoolani

8.2 EISPN DISTRIBUTION

This EISPN will be distributed to the agencies, organizations, and individuals listed in Table 5. An EISPN announcement will be placed in the Honolulu Advertiser and the Maui News.

Table 5. EISPN DISTRIBUTION

		O`ahu	Maui
Federal	U. S. Fish and Wildlife Service	X	
State	Dept. of Business, Economic Development and Tourism (DBEDT)	X	
	DBEDT, Energy, Resources and Technology Division	X	
	Dept. of Environmental Health, Planning Office	X	
	Dept. of Health, District Health Office		X
	Dept. of Land and Natural Resources (DLNR) Division of Forestry and Wildlife		X
	DLNR, Office of Conservation and Coastal Lands	X	
	DLNR, State Historic Preservation Division	X	X
	Office of Environmental Quality Control (OEQC)	X	
	Office of Hawaiian Affairs	X	X
	University of Hawai`i Environmental Center	X	
Hawai`i State Public Libraries	Hana Public and School Library		X
	Hawai`i Document Center, Hawai`i State Library	X	
	Kahului Public Library		X
	Kihei Public Library		X
	Lahaina Public Library		X
	Makawao Public Library		X
	Wailuku Public Library		X
County of Maui	Dept. of Parks and Recreation		
	Dept. of Planning		
	Dept. of Accounting and General Services, Public Works and Environmental Management		
	Maui County Council Member Robert Carroll		
	Maui County Council Member Dane Kane		
	Maui County Council Member Mike Molina		
	Maui County Council Member Charmaine Tavares		
Other Organizations and Individuals	Friends of Haleakalā, Ms. Mele Stokesberry		
	Kula Community Association, Ms. Karolyn Mossman		
	Maui Economic Development Board		
	Greg Brenner, Pacific Analytics, LLC		
	Mary Evanson		
	Erik Fredericksen, Xamanek Researches		
	Issac Hall		
	Charles Maxwell, CKM Cultural Resources		
	Dick Mayer		
	Bill Smith		
	Ron Terry, Geometrician Associates, LLC		
	Edmund Orszula		
	Forest and Kim Starr		

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9.0 REFERENCES

1. *Long Range Development Plan (LRDP)*, University of Hawai`i, Institute for Astronomy, 2005.

2. *Draft Environmental Assessment and Anticipated Finding of No Significant Impact (FONSI) for a Faulkes Telescope Facility*, Prepared for The Faulkes Telescope Corporation Haleakalā Facility and the University of Hawai`i, Institute for Astronomy, Prepared by KC Environmental, Inc., May 2001.

3. State of Hawai`i, Dept. of Land and Natural Resources, Office of Conservation and Coastal Lands.

4. *Rejuvenated Volcanism Along the Southwest Rift Zone, East Maui, Hawai`i*, Bergmanis, E.C., J. M. Sinton and F. A. Trusdell, Bull. Volcanol., 62, 239-255, 2000.

5. U.S. Soil Conservation Service, 1972.

6. University of Hawai`i, Institute for Astronomy, 1994.

7. *Aquifer Identification and Classification for Maui: Groundwater Protection Strategy for Hawai`i, No. 185*, Mink, John F. and L. Stephen Lau. February 1990.

8. *Haleakalā High Altitude Observatory, Stormwater Erosion Report*, Tetra Tech, 2005.

9. Maui County Data Book, 2002, General Statistics, 1.3.13 Population and Economic Projections, Maui County: 1998 to 2025.